Broad Agency Announcement

TELLUS

BIOLOGICAL TECHNOLOGIES OFFICE

HR001123S0027

April 21, 2023
TABLE OF CONTENTS

PART I: OVERVIEW INFORMATION ................................................................. 3

PART II: FULL TEXT OF ANNOUNCEMENT ............................................. 4

1. Funding Opportunity Description .......................................................... 4
   1.1. Program Overview ........................................................................... 4
   1.2. Background ................................................................................... 4
   1.3. Program Structure ......................................................................... 5
   1.4. Independent Verification and Validation (IV&V) ............................. 12
   1.5. Schedule ...................................................................................... 12
   1.6. Program Deliverables, Milestones and Metrics ............................ 12
   1.7. General Requirements ................................................................. 16

2. Award Information ................................................................................ 17
   2.1. General Award Information .......................................................... 17
   2.2. Fundamental Research .................................................................. 18

3. Eligibility Information ........................................................................... 23
   3.1. Eligible Applicants ......................................................................... 23
   3.2. Organizational Conflicts of Interest ............................................... 24
   3.3. Cost Sharing/Matching ................................................................. 25

4. Application and Submission Information .............................................. 25
   4.1. Address to Request Application Package ..................................... 25
   4.2. Contact and Form of Application Submission ............................... 26
   4.3. Funding Restrictions ..................................................................... 41
   4.4. Other Submission Information ...................................................... 41

5. Application Review Information ............................................................ 41
   5.1. Evaluation Criteria ....................................................................... 41
   5.2. Review of Proposals ..................................................................... 42
      5.2.4. Countering Foreign Influence Program (CFIP) ....................... 43

6. Award Administration Information ....................................................... 44
   6.1. Submission Status Notifications ................................................... 44
   6.2. Administrative and National Policy Requirements ....................... 44
   6.3. Reporting ..................................................................................... 45
   6.4. Electronic Systems ........................................................................ 45

7. Agency Contacts .................................................................................. 45

8. Other Information .................................................................................. 46
   8.1. Proposers Day .............................................................................. 46
   8.2. University Funding ....................................................................... 47

9. APPENDIX I – Volume II checklist ....................................................... 48
PART I: OVERVIEW INFORMATION

- **Federal Agency Name** – Defense Advanced Research Projects Agency (DARPA), Biological Technologies Office (BTO)
- **Funding Opportunity Title** – Tellus
- **Announcement Type** – Initial Announcement
- **Funding Opportunity Number** – HR001123S0027
- **North American Industry Classification System (NAICS)** – 541714
- **Catalog of Federal Domestic Assistance Numbers (CFDA)** – 12.910 Research and Technology Development
- **Dates**
  - Posting Date: **April 21, 2023**
  - Proposers’ Day: **May 2, 2023**
  - [https://sam.gov/opp/05e7ca96007348e3904123d10f90fbfc/view](https://sam.gov/opp/05e7ca96007348e3904123d10f90fbfc/view)
  - Proposal Abstract Due Date and Time: **May 18, 2023, 4:00 PM ET**
  - Full Proposal Due Date and Time: **July 6, 2023, 4:00 PM ET**
  - BAA Closing Date: **July 6, 2023**
- **Concise description of the funding opportunity** – The goal of the DARPA Tellus program is to develop the Methodology to program microbial sense-and-respond devices to reliably detect a variety of chemical and physical stimuli, process this information and generate measurable output signals in DoD-relevant environments. Tellus will assess the feasibility of utilizing microbial devices for environmental monitoring.
- **Anticipated individual awards** – Multiple awards are anticipated.
- **Types of instruments that may be awarded** – Procurement contract, Cooperative Agreement, or Other Transaction for Prototype agreements.
- **Agency contact**
  The BAA Coordinator for this effort may be reached at:  
  Tellus@darpa.mil  
  DARPA/BTO  
  ATTN: HR001123S0027  
  675 North Randolph Street  
  Arlington, VA 22203-2114
1. Funding Opportunity Description

This publication constitutes a Broad Agency Announcement (BAA) as contemplated in Federal Acquisition Regulation (FAR) 6.102(d)(2) and 35.016 and 2 CFR § 200.203. Any resultant award negotiations will follow all pertinent laws and regulations, and any negotiations and/or awards for procurement contracts will use procedures under FAR 15.4, Contract Pricing, as specified in the BAA. Proposals received as a result of this BAA shall be evaluated in accordance with evaluation criteria specified herein through a scientific review process.

The Defense Advanced Research Project Agency (DARPA) is soliciting innovative proposals to develop agile, reliable sensing devices that leverage microbes for environmental monitoring. Specifically, DARPA seeks to establish the range of chemical and physical stimuli that microbial “devices” can detect, environmental conditions they can tolerate, options for biologically-encoded information processing, types of output signals that can be generated, and theoretical stand-off or remote distances at which these signals could be detected. Tellus will focus on developing a Methodology that enables the reliable and reproducible design of agile, robust, and durable microbial sensors for environmental monitoring.

1.1. PROGRAM OVERVIEW

Tellus will explore the development of a platform Methodology for the rapid and modular design of microbe-based sensing systems to include tailoring of input stimuli and output signals, biologically-encoded signal processing, and response times. The microbial devices that are developed must be able to transduce detected stimuli into a variety of output signals (e.g., photons, colorimetric changes, chemicals, electric current, mechanical actuation) that are measurable by conventional “receiver” devices (e.g., optoelectronic, photonic, imaging, electrode). Classes of stimuli will include both chemical and physical, with emphasis on sensor functionality across many different environments and conditions. As remote environmental monitoring for existing and emerging threats, pollutants, or changing conditions is an area of DoD/national security interest, microbial sensing systems that are capable of detecting stimuli and/or relaying output signals at a distance and can operate unattended for long durations are desired. Tellus is a 2.5-year, single phase program focused on developing a Methodology that will enable rapid design, building, and testing of microbial sense-and-respond devices for environmental monitoring.

1.2. BACKGROUND

Current approaches to environmental monitoring rely on both distributed sensor nodes (e.g., on the ground or in the water) and remote sensing using platforms, like satellites or unmanned systems, to collect information important for the protection of people and assets. Although available environmental sensing methods offer many benefits, additional improvements would further strengthen our capabilities. These include enabling more rapid development of sensors for new threats, increasing spatial resolution and confidence in the assessment, and reducing power and logistical burden. Further, some sensing devices currently used in the field require samples to be manually collected and processed (e.g., water quality monitors) or are hand-carried, putting operators at risk. To reduce potential risk to personnel, equipment and structures,
sensors that are user-friendly, compact, can detect multiple threats, provide simple “yes/no” responses, and are compatible with many types of stand-off /remote “receiver” platforms would be impactful.

Microbial sense-and-respond devices offer promise for overcoming the challenges associated with environmental monitoring. There has been increased emphasis in recent years on expanding available options for input stimuli that can be detected and output signals that can be generated, as well as biologically-encoded information processing. Microbial sensors have been demonstrated for analytes such as heavy metals, organic pollutants, energetic compounds, chemical warfare agents, and gases, with sensitivities comparable to conventional sensors. Microbes are able to detect and discriminate between multiple target chemicals as well as respond to distinct physical stimuli (e.g., ultraviolet to near infrared light, electrical potential, low frequency ultrasound, magnetic fields, temperature changes, microwaves/radio frequencies). Some environmental microbes have demonstrated functionality in corrosive or high radiation conditions, and in the presence of terahertz electromagnetic radiation, which may be advantageous in certain settings. Microbial sensors capable of multiplexed stimuli detection with transduction to a single or multiple output signal types (e.g., chemical, mechanical, optical, gas, electrical, magnetic) using a variety of biologically-encoded signal processing circuits (e.g., digital, analog, neural network) have been developed. Microbial devices may offer endurance benefits over abiotic devices by harvesting energy to self-power and are readily sustained via encapsulation or within simple microfluidic systems.

While microbial sensing devices have been demonstrated, in general these utilized a bespoke approach with testing under ambient conditions in the lab. The ability to create agile, rapid, reliable, environmentally durable and deployable devices “on demand” will require additional development, which is the focus of the Tellus program. While synthetic biology tools are well-developed for model chassis organisms, and have been successful at demonstrating dynamic range and specificity in a lab-based setting, these approaches are underdeveloped for designing microbial “sense, process, and actuate” devices where stimuli and output signals can be customized and tested in realistic environmental conditions. Recent advances in microbial and biomolecular engineering with non-model chassis organisms and biological design automation could help address these limitations. The acquisition and employment of data to develop a microbial design Methodology tailored to environmental sensing applications will be paramount to overcoming the aforementioned challenges. This could be analogous to biological design automation tools that have been developed for metabolic synthesis of various products, but extend capabilities to allow for tailoring of stimulus sensing, specification of output signal type, and environmental conditions anticipated for operation.

1.3. PROGRAM STRUCTURE

This BAA solicits proposals which focus on developing (1) an interactive Methodology that enables rapid design of robust, reliable, user-specified microbial sense-and-respond devices in appropriate environments, and (2) fabrication and testing of several such microbial devices (“Tellus devices”). Proposers are required to address both Methodology Development with a user interface and Tellus Device Fabrication. Proposals must describe the technical approach planned to achieve the targeted improvements in Methodology Speed (reduction in time to design, build, and experimentally test devices) and Accuracy (increase in device success at
meeting performance criteria), as well as how successive Tellus devices will be fabricated and tested on shortened intervals. Tellus is a 2.5-year, single phase program that will be guided by the SCHEDULE and PROGRAM DELIVERABLES, MILESTONES AND METRICS as described in Sections 1.5 and 1.6, below.

Tellus performers will develop multiple (≥ 6), unique, microbial sense-and-respond devices based on the parameters provided in Table 1. The Tellus program goals are to ascertain which of the parameters noted in Table 1 can be reliably incorporated to create “Tellus devices” that will function in a range of environments, and to develop the Methodology to enable more facile development of bespoke sensors based on different combinations of these parameters to be reliably designed, built, and tested. To achieve this goal, DARPA aims to “pressure test” the design-build-test-learn cycle for such devices. Note that while Tellus does not aim to have performers experimentally demonstrate stand-off or remote detection using microbial devices, it will be important to determine what is theoretically feasible based on sensitivity toward input stimuli, and/or output signal types and strengths that can be generated.

1.3.1. Tellus Methodology and Device Development

Performers will design, build and test a total of (at least) six unique Tellus devices using parameters selected from Table 1. Proposals should include designs for five unique Tellus devices (see Table 2 for notional examples) with at least two device designs per operational domain. DARPA will choose two initial designs from these five, which will be the first two Tellus devices that selected teams will fabricate (see Section 1.6, Table 4 for completion dates). Subsequently, after the program commences, DARPA will select and provide to proposers the parameters for the next four devices at periodic intervals designed to “pressure-test” how quickly functional new devices can be designed, built, and tested. For this reason, it is likely that the DARPA-selected parameters for devices #3-#6 will NOT align with the proposer’s initial designs, and proposers should plan accordingly to be able to address a diverse set of parameters for devices #3-#6. This will allow the Tellus program to cover as many parameters in the table as possible.

For each completed device, it is expected that at least 10 complete ‘variants’ will be tested and made available to DARPA’s Independent Verification and Validation (IV&V) partners per scheduled deliverables (see Sections 1.4 and 1.5.3 for more details). This is to ensure sufficient data is collected to build a robust Methodology. “Variants” should differ from each other so as to attempt to optimize or vary functionality (e.g., increase range of activity, specificity, operating kinetics) or utilize different components (e.g., different ribosome binding sites, regulatory elements, environmental stress response genes, or information processing circuits). Performers should strive to optimize each of these devices in order to make a fair comparison.

Of equal importance to the actual microbial device fabrication and testing will be articulating the plan to use data obtained from these tests to inform the Methodology for designing robust and functional devices. The vision sought for the Methodology is to enable an end user to specify the kind of stimuli they’d like to detect; their preferred output signal; if they want to be able to distinguish between different stimuli or all possible combinations; and their anticipated environmental conditions. The Methodology would then provide guidance on the specific design needed for reliable operation: what chassis to use; which genetic circuits, biomolecular
components or pathways to build; and what kind of signal output strength they might expect. It is expected that many iterations of the Tellus device design-build-test-learn cycle (i.e., >10 variants per device for each of six devices) will be necessary to realize the gains sought for Speed and Accuracy of the Methodology. Performers will be encouraged to cooperate/collaborate with each other and DARPA’s IV&V partners to develop an optimized Methodology for Tellus devices. Proposals should include plans for data sharing with IV&V partners and DARPA. Proposals should also describe all necessary positive and negative controls, and identify anticipated technical challenges and associated risk mitigation strategies.

**Key technical challenges that will need to be overcome by the Tellus program:**

- Sensing and discriminating between different combinations of multiple stimuli.
- Lowering limits-of-detection without increasing background.
- Employing more sensitive receptors which have inherently smaller dynamic ranges that suffer from saturation at higher concentrations.
- Difficulty of use in realistic environmental conditions.
- Integration with “receiver” device(s) to collect/measure output signals.
- Overcoming genetic burden of added pathways/circuits on cells/efficacy.
- Determining whether to use single cells vs. multiple cells or consortia.
- Difficulties associated with robust circuitry design and high throughput testing.
- Response time needed for processing stimuli.
- Developing strategies to record and store stimulus detection events for retrieval at a later time.
- Multiplexing sensing modalities.
- Operating discriminately in the presence of confounders.

The proposed technical approach is expected to be multidisciplinary in order to address the development of the Methodology for designing the Tellus device, genetic and/or biomolecular engineering of the organism(s), bio-based energy harvesting to enable long endurance, and generation of output signals detectable via a “receiver” (that can potentially translate to stand-off or remote detection). Strategies for optimizing, integrating, and expanding capabilities should be elaborated throughout. Proposals should also discuss mitigation of technical challenges that may arise. Specifically excluded from this opportunity is research that: (1) proposes the use of plants (although microalgae are acceptable); (2) proposes use of well-established chemical stimuli such as antibiotics, quorum-sensing molecules, inducers like isopropyl β-D-1-thiogalactopyranoside (IPTG) or β-galactose; (3) proposes only the use of fluorescent or luminescent proteins for output signals; or (4) proposes a subset of the parameters in Table 1 as described (i.e., selection of an Environmental Domain, Environmental Condition, at least three Stimuli to be Sensed, at least one Biologically-encoded Information Processing step and at least one Output Signal/Communication Method for each proposed Tellus microbial device) – proposals that omit any of these parameter selections will be considered non-conforming and will not undergo further evaluation.
Each Tellus device must incorporate parameters from each section of Table 1 as noted:

- Reliable function in a selected Environmental Domain, coupled with an Environmental Condition.
- Detect and distinguish between at least three stimuli with at least one of these being a physical stimulus. Note that quantitative measurement of stimuli is not anticipated; rather the device should indicate that a detected stimulus is above or below a target threshold based on the potential risk to human health or potential to cause damage to equipment or other assets. Notional thresholds for stimuli are provided in Table 3, but proposers will need to provide justification for threshold values for the stimuli they select.
- Employ at least 1 information processing step.
- Generate one or more output signals in response to detected stimuli (individual stimuli or all combinations thereof).

Table 1: Tellus Microbial Device Parameters

<table>
<thead>
<tr>
<th>Environmental Domain (Choose 1)</th>
<th>Environmental Conditions (Choose 1)</th>
<th>Stimuli to be Sensed (Choose ≥3, must include ≥1 Physical)</th>
<th>Biologically-encoded Information Processing (Choose ≥1)</th>
<th>Output Signal/Communication Method (Choose ≥1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Terrestrial</td>
<td>- Hyperbaric</td>
<td>Chemical</td>
<td>- Electronic circuit equivalents</td>
<td>- Electric (current, voltage)</td>
</tr>
<tr>
<td>- Maritime</td>
<td>- Corrosive</td>
<td>- Organic Metals</td>
<td>- Neural networks</td>
<td>- Optical/multispectral</td>
</tr>
<tr>
<td></td>
<td>- Foliated</td>
<td>- Metals</td>
<td>- Analog or digital</td>
<td>- Chemicals/polymers</td>
</tr>
<tr>
<td></td>
<td>- Biofouled</td>
<td>- Gases</td>
<td>- Magnetic field</td>
<td>- Magnetic particles</td>
</tr>
<tr>
<td></td>
<td>- Swamp</td>
<td>- Radionuclides</td>
<td>- Electric (current, voltage)</td>
<td>- Mechanical actuation</td>
</tr>
<tr>
<td></td>
<td>- Murky</td>
<td>- Magnetic field</td>
<td>- Event recording</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- EM-cluttered/noisy</td>
<td>- Temperature</td>
<td>- Control systems</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Snow</td>
<td>- Ionizing radiation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Dusty/smoky</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Examples of device configurations that are considered “unique.” Note that these are representative examples, and solutions are not limited to those listed. All device configurations must select the required number of elements from each column in Table 1.

<table>
<thead>
<tr>
<th>Ex</th>
<th>Domain</th>
<th>Environmental Conditions (Choose 1)</th>
<th>Stimuli to be Sensed (Choose ≥3, must include ≥1 Physical)</th>
<th>Biologically-encoded Information Processing (Choose ≥1)</th>
<th>Output Signal/Communication Method (Choose ≥1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Terrestrial</td>
<td>Snow</td>
<td>- Acrylonitrile</td>
<td>Electronic circuit equivalents</td>
<td>Electric (current, voltage)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Heavy metal</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Temperature</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Terrestrial</td>
<td>Foliated</td>
<td>- Pesticide</td>
<td>Neural networks</td>
<td>Optical</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Copper</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Radioactivity</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Tellus Microbial Device Parameters (Description of Table 1):

Environmental Domain. Tellus devices developed for the Maritime domain will need to function in a submerged (i.e., not floating, unless in “swamp” conditions), aqueous environment. For the Terrestrial domain, Tellus devices may be tested on soil, other land features, or on object surfaces. Performers will need to establish device performance and reliability over the range of temperatures expected for the selected domain, as well as determine overall device endurance. For the Terrestrial domain effects of varying relative humidity should also be determined. For both domains, proposers will need to consider how output signals generated by their Tellus devices can be transmitted to a “receiver” device for collection and measurement that also functions in that domain.

Although Tellus seeks to understand how well microbial sensors can function in realistic environments and conditions, actual environmental release of organisms is not within scope. All experiments must be conducted in controlled, contained settings where any unintentional release of the engineered microbial components can be safely managed (e.g., environmental chambers).

Environmental Conditions.

- “Hyperbaric” experiments should assess functionality of the Tellus device at a minimum of 20 atm.
- “Corrosive” conditions of interest include those that cause chemical corrosion to electronic components such as salt water, sulfidic, acidic or basic conditions.
- “Foliated” conditions could include dense grasses, bushes, and/or trees.
- “Biofouled” could include surfaces covered by microbial biofilms; or macroscopic organisms.
- If “swamp” is selected, proposers should imagine a scenario where it is important to test water quality; in this case it is possible for the device to be deployed on the surface of the water.
- “Murky” conditions should be considered in the context of visible light penetration of less than 1 meter. A range of suspended particulate matter concentrations should be tested to understand the maximum density that can be tolerated and how this may affect stand-off detection.
- If “EM-cluttered/noisy” condition is selected, Tellus microbes should be shown to be functional in the presence of EM radiation typical of a cell phone tower or near a radio station.
- If the “snow” condition is chosen either real snow or ice particles (“artificial snow”) at temperatures below 0°C should be utilized.
- “Dusty/smoky” conditions should examine fine particles, ash, or actual smoke that may settle on or remain suspended around the Tellus device.
Stimuli to be Sensed (notional thresholds for stimuli detection provided in Table 3).

- **Chemicals, inorganics, gases**: Detection of organic chemicals such as fuel components, toxic industrial chemicals, synthetic opioids, herbicides, pesticides, or organophosphates are of interest. Metal elements such as copper, zinc, arsenic, lead, and radionuclides (e.g., uranium, thorium, iodine 131, cesium 137, strontium 90) are also of interest. Mock stimuli such as quorum sensing molecules, IPTG, galactose, and antibiotics, are ineligible as stimuli and proposing their use will be considered non-conforming.

- **Physical stimuli**:
  - Detection of magnetic or electrical stimuli should move beyond organism-level response (e.g., taxis by a magnetotactic bacterium toward a magnet) to approaches that directly couple the detection event to an intra- or inter-cellular signaling pathway.
  - Electromagnetic radiation detection should be tested against a range of wavelengths/frequencies in order to determine specificity (see Table 3).
  - Detection or response to discrete temperature changes should account for the likely ambient temperatures that will be found in the Environmental Domain. This parameter might also be addressed by using the Tellus device to monitor changes in temperature of an object located in the Environmental Domain.
  - Detection of radioactivity could involve detection of particles or photons associated with radioactive decay (e.g., alpha/beta particles, gamma rays). Heat and oxidative stress responses must be assessed in order to demonstrate that the microbial sensor response is specific to radiation. Because of technical challenges in applying ionizing radiation, it is acceptable to expose the microbial Tellus device to the radiation source, and then separately assess the signal processing and transduction components in a radiation-free setting.

- **Confounders**
  - At least 5 confounders per stimulus should be tested; enough confounders should be tested in order to determine the specificity limits and what dictates sensing specificity. For instance, chemical confounders should only vary slightly from the target compound. The environmental lifecycle of a chemical should also be considered, for example pesticide degradation products that still act as a pesticide, or indicate past use of the pesticide, may still be considered as the chemical target.

- **Non-targeted stimuli**: Off-target responses of the device should also be tested, to assess potential effects of other stimuli (e.g., effects of heat stress on detection of organic chemical targets) or leakiness of genetic circuits.

**Table 3: Tellus Notional Stimuli Thresholds. Performers should justify the threshold levels for the stimuli they propose based on risk or other rationale.**

<table>
<thead>
<tr>
<th>Source</th>
<th>Sub-class</th>
<th>Stimulus Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical</td>
<td>Organic (fuel components, pollutants, toxic chemicals, synthetic opioids)</td>
<td>0.1 ppb</td>
</tr>
<tr>
<td></td>
<td>Inorganics</td>
<td>1 ppb</td>
</tr>
<tr>
<td>Visible/near-IR</td>
<td>Visible → near IR</td>
<td>0.1 lux</td>
</tr>
<tr>
<td>EMF</td>
<td>Microwaves, radio waves</td>
<td>**</td>
</tr>
</tbody>
</table>
**See [https://www.govinfo.gov/content/pkg/CFR-2021-title47-vol1/xml/CFR-2021-title47-vol1-sec1-1310.xml](https://www.govinfo.gov/content/pkg/CFR-2021-title47-vol1/xml/CFR-2021-title47-vol1-sec1-1310.xml) for detailed information.**

<table>
<thead>
<tr>
<th>Magnetic</th>
<th>Not applicable</th>
<th>2 milli Tesla (mT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radioactive decay</td>
<td>All</td>
<td>3 rads (0.03 Grays)</td>
</tr>
</tbody>
</table>

**Biological Encoded Information Processing.** This category addresses stimuli processing and transduction within the Tellus device. Once stimuli (chemical or physical) are detected that information should be biologically processed to render it interpretable by a “receiver” platform. It is important that for each stimulus detected by the Tellus device, a distinguishable output signal be generated. It is anticipated that for some output signals, electronic circuit-equivalent operations such as signal amplification, switching, oscillation, or control systems such as feed-forward or feed-back loops, or timers may be useful. Implementation of genetically or biomolecularly-encoded Boolean logic operations, neural network, or analog processing may also be utilized to facilitate discrimination between different stimuli (or combinations thereof), setting of thresholds, expansion of dynamic range, influencing of response times, or other device operations. A particularly challenging end point that is sought by Tellus is to temporally record and subsequently read out when detection events have occurred without requiring laboratory sequencing of the microbe’s DNA or RNA. Whichever information processing steps are incorporated, laboratory measurements should confirm that each step is working as anticipated.

**Output Signal/Communication Method.** Output signal methods must be theoretically strong enough to communicate with a receiver platform at stand-off as shown in the metrics table *(Section 1.6.2, Table 5).* Performers are not required to experimentally test their microbial device at these stand-off distances but should theoretically calculate what is possible based upon measured output signal strength. Tellus devices may be interfaced with a signal measuring system (i.e., a “receiver”) either through a direct connection (i.e., output signals leave the cells and are immediately collected by the receiver) or an indirect connection (output signals generated by the cells are detected by a receiver located some distance away). Although a minimum of one output signal is specified in *Table 1,* it is important to be able to distinguish between the three or more stimuli the Tellus device is programmed to detect, by virtue of the information processing routines that are developed, and output signals that are generated. This could mean tailoring the single output signal (e.g., electric currents produced at different voltage potentials; different pigments or fluorophores), or could entail different output signals aligned to each stimulus detected. Output signal may be amplified or diversified with the addition of abiotic components such as carbon nanotubes, quantum dots, dyes, or other nanomaterials; however, these modifications should not be the dominant element in the process of detecting, processing, or outputting the signal. Collection and processing of signals generated by Tellus devices can be accomplished using standard instrumentation (e.g., photodetectors, cameras, spectrometers, magnetometers) in laboratory settings or, if desired, may be accomplished using detectors mounted on unmanned systems or hand-held devices. [Note: it is expected that all experiments will be performed in a contained environment; no environmental release or outdoor testing is envisioned].

- Electric (current-voltage) – production of electric current or voltage as an output signal should be detectable via an electrode array, voltmeter, or other means.
- Optical/multispectral signal(s) – production of photons detectable using a camera, photodiode, or comparable imaging system.
• Chemicals/polymers/pigments – production of a detectable non-toxic chemical, such as a gas, polymer or pigment. Detection could occur via optical, spectral or mechanical means.
• Magnetic particles – this form of output signal would be expected to render the Tellus device to be detectable by a magnetic sensor or to physically migrate to a magnetized object.
• Mechanical actuation – this output signal type could affect motion or operation of another system component (e.g., gears, switches, levers, microrobots).

1.3.2. Eligible Organisms
Microbial organisms that are appropriate include non-pathogenic bacteria, archaea, spores, or single cell eukaryotes (algae, fungi), that ideally have demonstrated functionality in the selected Environmental Domains and Environmental Conditions described in Table 1. Performers will need to understand growth rates, managing biomass (without environmental release of genetically modified organisms) and how this affects sensor function in different Tellus device configurations. While integrating detection of multiple stimuli, information processing and output signal generation into a single organism could achieve Tellus program goals, use of a microbial consortia approach would also be responsive to this BAA. Should a consortial approach be proposed, it should be clear how the organisms selected work in concert with each other in regard to multiplexed stimuli detection and response (times, output signals).

1.4. INDEPENDENT VERIFICATION AND VALIDATION (IV&V)
Throughout the program, the performers will work with an IV&V team established by DARPA. The IV&V team will consist of subject matter experts from the Government, to include Federally Funded Research and Development Centers (FFRDCs). The IV&V team will test and validate the ability of performer-generated Tellus sensing devices to function as described by the performer and may also compare them to conventional sensing systems. The IV&V partners may also assess and consolidate performer methodologies into a unified methodology using performer-provided data and algorithms. Table 4 below describes the schedule for delivery of performer-developed strains and protocols to the IV&V team for testing and evaluation. To avoid potential conflicts of interest, performers for HR001123S0027 will not be allowed to compete for the IV&V contract. HR001123S0027 is not soliciting proposals for IV&V.

1.5. SCHEDULE
The Tellus program will last 2.5 years, across a single phase. Progress towards the stated goals will be assessed throughout the program against the provided milestones and metrics tables (Section 1.6, Tables 4 and 5) as well as performer-defined milestones in the Statement of Work (SOW).

1.6. PROGRAM DELIVERABLES, MILESTONES AND METRICS
1.6.1. Tellus Deliverables, Milestones and Specifications
Table 4 below describes the expected deliverables for Tellus, the completion due dates and specifications for the performance of the Tellus devices. Deliverables for both the Tellus Methodology and Device Fabrication and testing are included. As noted in Section 1.3.1 above, the first 2 Tellus devices will be selected from the proposal’s five submitted designs; these will
be due at Months 6 and 10. DARPA will subsequently provide device parameters for Tellus devices 3-6; these parameters will be provided at Months 12, 15, 18 and 21 with each due 3 months later (i.e., at Months 15, 18, 21 and 24, respectively). In order to best test their Methodology development to assess Speed and Accuracy, performers should plan on making and testing at least 10 variants of each device. The specifications provided in Table 4 articulate expected device performance characteristics typically expected of sensors, such as being able to specifically respond to target stimuli and not confounders, and to generate output signals that (theoretically) can be detected at stand-off. Although specific ranges are not provided, performers will be expected to establish the temperature and relative humidity ranges over which their devices can reliably function, as well as establish their endurance. The latter includes determining how long the Tellus devices remain functional and reliable, which may include assessing microbial viability, biomass management, provision of nutrients/energy sources, and any loss in performance over time. Performers are expected to provide Tellus Devices and their final Methodology to DARPA’s IV&V partners for comparative testing and evaluation (see Table 4).

Table 4: Tellus Milestones, Deliverables and Specifications

<table>
<thead>
<tr>
<th>Month</th>
<th>Milestones and Deliverables</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>• Draft Methodology - Establish program start baselines for Speed and Accuracy.</td>
<td></td>
</tr>
</tbody>
</table>
| 6     | • Complete fabrication and testing of Tellus Device #1 (Performer specs).  
      • Deliver Tellus Device #1 to IV&V partner. | Methodology - a user interface such as a web application, standalone design tool or program code that can be downloaded. Devices must:  
      • Detect and distinguish between selected input stimuli:  
        • At relevant thresholds.  
        • In presence of at least five confounding signals.  
        • Insensitive to non-targeted stimuli.  
      • Reliably execute information processing.  
      • Generate selected output signal(s) at levels sufficient for detection at stand-off distance (theoretical |
| 10    | • Complete fabrication and testing of Tellus Device #2 (Performer specs).  
      • Deliver Tellus Device #2 to IV&V partner. | |
| 12    | • Report on Interim Methodology.  
      • DARPA provides parameters for Tellus Device #3. | |
| 15    | • Complete fabrication and testing of Tellus Device #3.  
      • Deliver Tellus Device #3 to IV&V partner.  
      • DARPA provides parameters for Tellus Device #4. | |
| 18    | • Complete fabrication and testing of Tellus Device #4  
      • Deliver Tellus Device #4 to IV&V partner.  
      • DARPA provides parameters for Tellus Device #5. | |
1.6.2. Tellus Program Metrics

The specific metrics for development of both Tellus Methodology and Devices expected at various timepoints across the 2.5-year, single phase program are given in Table 5, Metrics for Tellus Devices. More detail on what each metric is seeking is provided below:

**Methodology Development:** The key deliverable for the Tellus program will be the Methodology that defines how reliable and robust microbial sense-and-response devices can be designed, built and tested. The final Methodology could be a user-friendly dashboard that enables the operator to select specific environments, conditions, stimuli and output signals for their desired configuration, and then provides a design specifying chassis type, circuits/parts, and type of “receiver” system needed for reliable and robust performance. Key metrics for assessing progress in Tellus Methodology development will be Speed (defined as a reduction in the time required to design, build and experimentally test Tellus devices) and Accuracy (defined as the increase in device success at meeting the performance criteria, such as Sensitivity and Specificity).

**Theoretical System Stand-off:** The sum of the “target to biological sensor” and “biological sensor to receiver” distances. Experimental measurement of stand-off or remote detection distance is not a required outcome, however, based on experimental measurements of sensitivity to input stimuli and/or strength of output signal that is generated, a theoretical calculation of these distances should be conducted. Target distances for both “Terrestrial” and “Maritime” domains are provided in Table 5. Performers may utilize conventional laboratory instruments/equipment to collect and measure the output signal(s) generated by their Tellus devices, using either direct contact or interfaces that involve physical separation of the microbe and signal measurement system.

**Device Sensitivity and Specificity:** As for other environmental monitoring systems, two key performance parameters are sensitivity and specificity, which aim to reduce false positive and negative detection events.
Sensitivity is defined as the number of true positive detection events (i.e., stimuli accurately detected, TP) divided by the total number of positive detection events (P):

\[
\text{Sensitivity} = \frac{\text{TP}}{\text{P}}
\]

Specificity is defined as the number of true negative events (confounders identified as confounders, confounders ignored, or confounders not detected; TN) divided by the total number of negative events (N):

\[
\text{Specificity} = \frac{\text{TN}}{\text{N}}
\]

Device Endurance and Response Time: Performers will have to address endurance and response time goals for their Tellus devices as requested in Table 5. These will ideally be tunable to allow maximum flexibility to adapt to various environmental monitoring applications. It is anticipated that strategies to help the microbes remain fully functional for long periods may include environmental energy or nutrient scavenging; encapsulation; use of microbial consortia; and stimulus detection modes that reduce reliance on transcription/translation approaches.

Containment of genetically-modified microbes: Containment is defined as the number of escaped microbes divided by the total number of microbes. Although release of genetically modified microbes (GMM) into the environment is not a component of the Tellus program, it is important that proposers incorporate safeguards to mitigate this risk. Physical and/or genetic strategies to ensure containment must be included in the proposal. It is the responsibility of the performer to obtain any necessary permits and to comply with institutional/local/state/Federal regulations applicable to the proposed research.

**Table 5: Metrics for Tellus Devices**

<table>
<thead>
<tr>
<th>Metric</th>
<th>Month 3</th>
<th>Month 6</th>
<th>Month 12</th>
<th>Month 18</th>
<th>Month 24</th>
<th>Month 30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methodology – Speed</td>
<td>Establish baseline</td>
<td></td>
<td>3-fold decrease relative to baseline</td>
<td></td>
<td>5-fold decrease relative to baseline</td>
<td>8-fold decrease relative to baseline</td>
</tr>
<tr>
<td>Methodology – Accuracy</td>
<td>Establish baseline</td>
<td></td>
<td>2-fold increase relative to baseline</td>
<td></td>
<td>3-fold increase relative to baseline</td>
<td>5-fold increase relative to baseline</td>
</tr>
<tr>
<td>Theoretical system stand-off</td>
<td></td>
<td>&gt;5 m (terrestrial)</td>
<td></td>
<td>&gt;0.3 m (maritime)</td>
<td></td>
<td>&gt;10 m (terrestrial)</td>
</tr>
<tr>
<td>Sensitivity (TP/P)</td>
<td>0.75</td>
<td>0.75</td>
<td>0.80</td>
<td>0.90</td>
<td>0.95</td>
<td></td>
</tr>
<tr>
<td>Specificity (TN/N)</td>
<td>0.75</td>
<td>0.75</td>
<td>0.80</td>
<td>0.90</td>
<td>0.95</td>
<td></td>
</tr>
</tbody>
</table>
1.7. GENERAL REQUIREMENTS

1.7.1. Proposing Teams
Proposer teams must address the Tellus Program Schedule, Deliverables, Milestones and Metrics as described above in Sections 1.5 and 1.6. Consequently, it is expected that the teams will include experts from the multiple disciplines related to the program challenges and goals (e.g., synthetic biology, environmental microbiology, signal processing, biological design automation, environmental monitoring, remote sensing). Because several different technologies must ultimately work together to prototype a functional sensing system, teams must identify one or more members as project integrators who will ensure those team members focused on a specific supporting technology are also appropriately working towards the overall project goal. The project integrator should also address all risks specifically associated with integration. Specific content, communications, networking, and team formation are the sole responsibility of the proposer teams. Proposer teams must submit a single, integrated proposal led by a Prime Contractor or Lead research institution.

1.7.2. Controlled Unclassified Information (CUI)
Given the aim of Tellus to develop a new sensing paradigm for use in environmental monitoring, it is possible that detection of certain proposed stimuli, when coupled with output signal types and/or specific environmental conditions, may require protection as CUI. Proprietary or other sensitive technical information will also require safeguarding or dissemination controls pursuant to and consistent with applicable law, regulations, and Government-wide policies. Proposers should review the attached Tellus CUI guide and the Tellus Science and Technology Protection Plan (S&T P2), provided by BTO Security upon request (BTO_Security@darpa.mil), and, if relevant to the work proposed, should include a draft Science and Technology Protection Implementation Plan (S&T PIP) with their proposal to DARPA [see Section 4.2.2.A. Volume I, Technical and Management Proposal, Section III; Attachment 1 - CUI Guide; Attachment 2 – Science & Technology Protection Implementation Plan (S&T PIP) Template]. Performers must partition potentially sensitive/CUI tasks from non-sensitive research efforts, and are asked to identify sensitive/CUI tasks within their Statement of Work (Attachment 3 – Statement of Work Template). All performers (prime contractor and subcontractors) supporting efforts with sensitive/CUI tasks that desire public release of project information will be required to submit a request for public release from DARPA in accordance with their contractual requirements. As such, organizations that can comply with DoD CUI requirements as described in Attachment 1 must be part of the proposed team.

1.7.3. Other Requirements
Performers are expected to attend semi-annual program reviews to provide updates to the
DARPA program management team, IV&V partners, Government stakeholders and other Tellus performers on progress towards their milestones and scientific goals on the Tellus program. Performers will also summarize outstanding challenges and limitations that must still be overcome to achieve the overarching goals of the program. Cooperation and collaboration between Tellus performers and IV&V partners to develop an optimized final Tellus Methodology are also expected. This may involve sharing of raw and/or processed data with DARPA and/or IV&V partners. DARPA and IV&V personnel may also conduct periodic site visits.

2. Award Information

2.1. General Award Information

Multiple awards are possible. Resources made available under this BAA will depend on the quality of the proposals received, and the availability of funds.

The Government reserves the right to select for negotiation all, some, one, or none of the proposals received in response to this solicitation and to make awards without discussions with proposers. The Government also reserves the right to conduct discussions if it is later determined to be necessary. If warranted, portions of resulting awards may be segregated into pre-priced options. Additionally, DARPA reserves the right to accept proposals in their entirety or to select only portions of proposals for award. In the event that DARPA desires to award only portions of a proposal, negotiations may be opened with that proposer. The Government reserves the right to fund proposals in phases with options for continued work, as applicable.

The Government reserves the right to request any additional, necessary documentation once it makes the award instrument determination. Such additional information may include but is not limited to Representations and Certifications (see Section VI.B.2., “Representations and Certifications”). The Government reserves the right to remove proposers from award consideration should the parties fail to reach agreement on award terms, conditions, and/or cost/price within a reasonable time, and the proposer fails to timely provide requested additional information. Proposals identified for negotiation may result in a procurement contract, cooperative agreement, or other transaction, depending upon the nature of the work proposed, the required degree of interaction between parties, whether or not the research is classified as Fundamental Research, and other factors.

Proposers looking for innovative, commercial-like contractual arrangements are encouraged to consider requesting Other Transactions. To understand the flexibility and options associated with Other Transactions, consult http://www.darpa.mil/work-with-us/contract-management#OtherTransactions.

In accordance with 10 U.S.C. § 4022(f), the Government may award a follow-on production contract or Other Transaction (OT) for any OT awarded under this solicitation if: (1) that participant in the OT, or a recognized successor in interest to the OT, successfully completed the entire prototype project provided for in the OT, as modified; and (2) the OT provides for the award of a follow-on production contract or OT to the participant, or a recognized successor in interest to the OT.
In all cases, the Government contracting officer shall have sole discretion to select award instrument type, regardless of instrument type proposed, and to negotiate all instrument terms and conditions with selectees. DARPA will apply publication or other restrictions, as necessary, if it determines that the research resulting from the proposed effort will present a high likelihood of disclosing performance characteristics of military systems or manufacturing technologies that are unique and critical to defense. Any award resulting from such a determination will include a requirement for DARPA permission before publishing any information or results on the program. For more information on publication restrictions, see the section below on Fundamental Research.

2.2. FUNDAMENTAL RESEARCH

It is DoD policy that the publication of products of fundamental research will remain unrestricted to the maximum extent possible. National Security Decision Directive (NSDD) 189 defines fundamental research as follows:

‘Fundamental research’ means basic and applied research in science and engineering, the results of which ordinarily are published and shared broadly within the scientific community, as distinguished from proprietary research and from industrial development, design, production, and product utilization, the results of which ordinarily are restricted for proprietary or national security reasons.

As of the date of publication of this solicitation, the Government expects that program goals as described herein may be met by proposed efforts for fundamental research and non-fundamental research. Some proposed research may present a high likelihood of disclosing performance characteristics of military systems or manufacturing technologies that are unique and critical to defense. Based on the anticipated type of proposer (e.g., university or industry) and the nature of the solicited work, the Government expects that some awards will include restrictions on the resultant research that will require the awardee to seek DARPA permission before publishing any information or results relative to the program.

University or non-profit research institution performance under this solicitation may include effort categorized as fundamental research. In addition to Government support for free and open scientific exchanges and dissemination of research results in a broad and unrestricted manner, the academic or non-profit research performer or recipient, regardless of tier, acknowledges that such research may have implications that are important to U.S. national interests and must be protected against foreign influence and exploitation. As such, the academic or non-profit research performer or recipient agrees to comply with the following requirements:

(a) The University or non-profit research institution performer or recipient must establish and maintain an internal process or procedure to address foreign talent programs, conflicts of commitment, conflicts of interest, and research integrity. The academic or non-profit research performer or recipient must also utilize due diligence to identify Foreign Components or participation by Senior/Key Personnel in Foreign Government Talent Recruitment Programs and agree to share such information with the Government upon request.
i. The above described information will be provided to the Government as part of the proposal response to the solicitation and will be reviewed and assessed prior to award. Generally, this information will be included in the Research and Related Senior/Key Personnel Profile (Expanded) form (SF-424) required as part the proposer’s submission through Grants.gov.

   1. Instructions regarding how to fill out the SF-424 and its biographical sketch can be found through Grants.gov.

ii. In accordance with USD(R&E) direction to mitigate undue foreign influence in DoD-funded science and technology, DARPA will assess all Senior/Key Personnel proposed to support DARPA grants and cooperative agreements for potential undue foreign influence risk factors relating to professional and financial activities. This will be done by evaluating information provided via the SF-424, and any accompanying or referenced documents, in order to identify and assess any associations or affiliations the Senior/Key Personnel may have with foreign strategic competitors or countries that have a history of intellectual property theft, research misconduct, or history of targeting U.S. technology for unauthorized transfer. DARPA’s evaluation takes into consideration the entirety of the Senior/Key Personnel’s SF-424, current and pending support, and biographical sketch, placing the most weight on the Senior/Key Person’s professional and financial activities over the last 4 years. The majority of foreign entities lists used to make these determinations are publicly available. The DARPA Countering Foreign Influence Program (CFIP) “Senior/Key Personnel Foreign Influence Risk Rubric” details the various risk ratings and factors. The rubric can be seen at the following link: https://www.darpa.mil/attachments/092021DARPACFIPRubric.pdf

iii. Examples of lists that DARPA leverages to assess potential undue foreign influence factors include, but are not limited to:

   5. Director of National Intelligence (DNI) “World Wide Threat Assessment of the US Intelligence Community”: 2021 Annual Threat Assessment of the U.S. Intelligence Community (dni.gov)

(b) DARPA’s analysis and assessment of affiliations and associations of Senior/Key Personnel is compliant with Title VI of the Civil Rights Act of 1964. Information regarding race, color, or national origin is not collected and does not have bearing in DARPA’s assessment.

(c) University or non-profit research institutions with proposals selected for negotiation that have been assessed as having high or very high undue foreign influence risk, will be given an opportunity during the negotiation process to mitigate the risk. DARPA reserves the right to request any follow-up information needed to assess risk or mitigation strategies.

i. Upon conclusion of the negotiations, if DARPA determines, despite any proposed mitigation terms (e.g. mitigation plan, alternative research personnel), the participation of any Senior/Key Research Personnel still represents high risk to the program, or proposed mitigation affects the Government’s confidence in proposer’s capability to successfully complete the research (e.g., less qualified Senior/Key Research Personnel) the Government may determine not to award the proposed effort. Any decision not to award will be predicated upon reasonable disclosure of the pertinent facts and reasonable discussion of any possible alternatives while balancing program award timeline requirements.

(d) Failure of the academic or non-profit research performer or recipient to reasonably exercise due diligence to discover or ensure that neither it nor any of its Senior/Key Research Personnel involved in the subject award are participating in a Foreign Government Talent Program or have a Foreign Component with a strategic competitor or country with a history of targeting U.S. technology for unauthorized transfer may result in the Government exercising remedies in accordance with federal law and regulation.

i. If, at any time, during performance of this research award, the academic or non-profit research performer or recipient should learn that it, its Senior/Key Research Personnel, or applicable team members or sub-tier performers on this award are or are believed to be participants in a Foreign Government Talent Program or have Foreign Components with a strategic competitor or country with a history of targeting U.S. technology for unauthorized transfer, the performer or recipient will notify the Government Contracting Officer or Agreements Officer within 5 business days.

1. This disclosure must include specific information as to the personnel involved and the nature of the situation and relationship. The Government will have 30 business days to review this information and conduct any necessary fact-finding or discussion with the performer or recipient.

2. The Government’s timely determination and response to this disclosure may range anywhere from acceptance, to mitigation, to termination of this award at the Government’s discretion.
3. If the University receives no response from the Government to its disclosure within 30 business days, it may presume that the Government has determined the disclosure does not represent a threat.

ii. The performer or recipient must flow down this provision to any subtier contracts or agreements involving direct participation in the performance of the research.

(e) Definitions

i. Senior/Key Research Personnel

1. This definition would include the Principal Investigator or Program/Project Director and other individuals who contribute to the scientific development or execution of a project in a substantive, measurable way, whether or not they receive salaries or compensation under the award. These include individuals whose absence from the project would be expected to impact the approved scope of the project.

2. Most often, these individuals will have a doctorate or other professional degrees, although other individuals may be included within this definition on occasion.

ii. Foreign Associations/Affiliations

1. Association is defined as collaboration, coordination or interrelation, professionally or personally, with a foreign government-connected entity where no direct monetary or non-monetary reward is involved.

2. Affiliation is defined as collaboration, coordination, or interrelation, professionally or personally, with a foreign government-connected entity where direct monetary or non-monetary reward is involved.

iii. Foreign Government Talent Recruitment Programs

1. In general, these programs will include any foreign-state-sponsored attempt to acquire U.S. scientific-funded research or technology through foreign government-run or funded recruitment programs that target scientists, engineers, academics, researchers, and entrepreneurs of all nationalities working and educated in the U.S.

2. Distinguishing features of a Foreign Government Talent Recruitment Program may include:

   a. Compensation, either monetary or in-kind, provided by the foreign state to the targeted individual in exchange for the individual transferring their knowledge and expertise to the foreign country.

   b. In-kind compensation may include honorific titles, career advancement opportunities, promised future compensation or other types of remuneration or compensation.

   c. Recruitment, in this context, refers to the foreign-state-sponsor’s active engagement in attracting the targeted individual to join the foreign-sponsored program and transfer their knowledge and
expertise to the foreign state. The targeted individual may be employed and located in the U.S. or in the foreign state.

d. Contracts for participation in some programs that create conflicts of commitment and/or conflicts of interest for researchers. These contracts include, but are not limited to, requirements to attribute awards, patents, and projects to the foreign institution, even if conducted under U.S. funding, to recruit or train other talent recruitment plan members, circumventing merit-based processes, and to replicate or transfer U.S.-funded work in another country.

e. Many, but not all, of these programs aim to incentivize the targeted individual to physically relocate to the foreign state. Of particular concern are those programs that allow for continued employment at U.S. research facilities or receipt of U.S. Government research funding while concurrently receiving compensation from the foreign state.

3. Foreign Government Talent Recruitment Programs DO NOT include:

a. Research agreements between the University and a foreign entity, unless that agreement includes provisions that create situations of concern addressed elsewhere in this section,

b. Agreements for the provision of goods or services by commercial vendors, or

c. Invitations to attend or present at conferences.

iv. Conflict of Interest

1. A situation in which an individual, or the individual’s spouse or dependent children, has a financial interest or financial relationship that could directly and significantly affect the design, conduct, reporting, or funding of research.

v. Conflict of Commitment

1. A situation in which an individual accepts or incurs conflicting obligations between or among multiple employers or other entities.

2. Common conflicts of commitment involve conflicting commitments of time and effort, including obligations to dedicate time in excess of institutional or funding agency policies or commitments. Other types of conflicting obligations, including obligations to improperly share information with, or withhold information from, an employer or funding agency, can also threaten research security and integrity and are an element of a broader concept of conflicts of commitment.

vi. Foreign Component

1. Performance of any significant scientific element or segment of a program or project outside of the U.S., either by the University or by a researcher
employed by a foreign organization, whether or not U.S. government funds are expended.

2. Activities that would meet this definition include, but are not limited to:
   a. Involvement of human subjects or animals;
   b. Extensive foreign travel by University research program or project staff for the purpose of data collection, surveying, sampling, and similar activities;
   c. Collaborations with investigators at a foreign site anticipated to result in co-authorship;
   d. Use of facilities or instrumentation at a foreign site;
   e. Receipt of financial support or resources from a foreign entity; or
   f. Any activity of the University that may have an impact on U.S. foreign policy through involvement in the affairs or environment of a foreign country.

3. Foreign travel is not considered a Foreign Component.

vii. Strategic Competitor
1. A nation, or nation-state, that engages in diplomatic, economic or technological rivalry with the United States where the fundamental strategic interests of the U.S are under threat.

Proposers should indicate in their proposal whether they believe the scope of the research included in their proposal is fundamental or not. While proposers should clearly explain the intended results of their research, the Government shall have sole discretion to determine whether the proposed research shall be considered fundamental and to select the award instrument type. Appropriate language will be included in resultant awards for non-fundamental research to prescribe publication requirements and other restrictions, as appropriate. This language can be found at [http://www.darpa.mil/work-with-us/additional-baa](http://www.darpa.mil/work-with-us/additional-baa).

For certain research projects, it may be possible that although the research to be performed by a potential awardee is non-fundamental research, its proposed subawardee’s effort may be fundamental research. It is also possible that the research performed by a potential awardee is fundamental research while its proposed subawardee’s effort may be non-fundamental research. In all cases, it is the potential awardee’s responsibility to explain in its proposal which proposed efforts are fundamental research and why the proposed efforts should be considered fundamental research.

3. Eligibility Information

3.1. Eligible Applicants

All responsible sources capable of satisfying the Government's needs may submit a proposal that shall be considered by DARPA. Historically Black Colleges and Universities, Small Businesses, Small Disadvantaged Businesses and Minority Institutions are encouraged to submit proposals.
and join others in submitting proposals; however, no portion of this announcement will be set aside for these organizations’ participation due to the impracticality of reserving discrete or severable areas of this research for exclusive competition among these entities.

3.1.1. **Federally Funded Research and Development Centers (FFRDCs) and Government Entities**

**FFRDCs**

FFRDCs are subject to applicable direct competition limitations and cannot propose to this solicitation in any capacity unless they meet the following conditions. (1) FFRDCs must clearly demonstrate that the proposed work is not otherwise available from the private sector. (2) FFRDCs must provide a letter, on official letterhead from their sponsoring organization, that (a) cites the specific authority establishing their eligibility to propose to Government solicitations and compete with industry, and (b) certifies the FFRDC’s compliance with the associated FFRDC sponsor agreement’s terms and conditions. These conditions are a requirement for FFRDCs proposing to be awardees or subawardees.

**Government Entities**

Government Entities (e.g., Government/National laboratories, military educational institutions, etc.) are subject to applicable direct competition limitations. Government Entities must clearly demonstrate that the work is not otherwise available from the private sector and provide written documentation citing the specific statutory authority and contractual authority, if relevant, establishing their ability to propose to Government solicitations and compete with industry. This information is required for Government Entities proposing to be awardees or subawardees.

**Authority and Eligibility**

At the present time, DARPA does not consider 15 U.S.C. § 3710a to be sufficient legal authority to show eligibility. While 10 U.S.C.§ 4892 may be the appropriate statutory starting point for some entities, specific supporting regulatory guidance, together with evidence of agency approval, will still be required to fully establish eligibility. DARPA will consider FFRDC and Government Entity eligibility submissions on a case-by-case basis; however, the burden to prove eligibility for all team members rests solely with the proposer.

3.1.2. **Non-U.S. Organizations**

Non-U.S. organizations and/or individuals may participate to the extent that such participants comply with any necessary nondisclosure agreements, security regulations, export control laws, and other governing statutes applicable under the circumstances.

3.2. **Organizational Conflicts of Interest**

**FAR 9.5 Requirements**

In accordance with FAR 9.5, proposers are required to identify and disclose all facts relevant to potential OCIs involving the proposer’s organization and any proposed team member (subawardee, consultant). Under this Section, the proposer is responsible for providing this disclosure with each proposal submitted to the solicitation. The disclosure must include the proposer’s, and as applicable, proposed team member’s OCI mitigation plan. The OCI mitigation plan must include a description of the actions the proposer has taken, or intends to take, to
prevent the existence of conflicting roles that might bias the proposer’s judgment and to prevent the proposer from having unfair competitive advantage. The OCI mitigation plan will specifically discuss the disclosed OCI in the context of each of the OCI limitations outlined in FAR 9.505-1 through FAR 9.505-4.

Agency Supplemental OCI Policy
In addition, DARPA has a supplemental OCI policy that prohibits contractors/performers from concurrently providing Scientific Engineering Technical Assistance (SETA), Advisory and Assistance Services (A&AS) or similar support services and being a technical performer. Therefore, as part of the FAR 9.5 disclosure requirement above, a proposer must affirm whether the proposer or any proposed team member (subawardee, consultant) is providing SETA, A&AS, or similar support to any DARPA office(s) under: (a) a current award or subaward; or (b) a past award or subaward that ended within one calendar year prior to the proposal’s submission date. If SETA, A&AS, or similar support is being or was provided to any DARPA office(s), the proposal must include:

- The name of the DARPA office receiving the support;
- The prime contract number;
- Identification of proposed team member (subawardee, consultant) providing the support; and
- An OCI mitigation plan in accordance with FAR 9.5.

Government Procedures
In accordance with FAR 9.503, 9.504 and 9.506, the Government will evaluate OCI mitigation plans to avoid, neutralize or mitigate potential OCI issues before award and to determine whether it is in the Government’s interest to grant a waiver. The Government will only evaluate OCI mitigation plans for proposals that are determined selectable under the solicitation evaluation criteria and funding availability.

The Government may require proposers to provide additional information to assist the Government in evaluating the proposer’s OCI mitigation plan. If the Government determines that a proposer failed to fully disclose an OCI; or failed to provide the affirmation of DARPA support as described above; or failed to reasonably provide additional information requested by the Government to assist in evaluating the proposer’s OCI mitigation plan, the Government may reject the proposal and withdraw it from consideration for award.

3.3. COST SHARING/MATCHING
Cost sharing is not required; however, it will be carefully considered where there is an applicable statutory condition relating to the selected funding instrument. Cost sharing is encouraged where there is a reasonable probability of a potential commercial application related to the proposed research and development effort.

For more information on potential cost sharing requirements for Other Transactions for Prototype, see http://www.darpa.mil/work-with-us/contract-management#OtherTransactions.

4. Application and Submission Information

4.1. ADDRESS TO REQUEST APPLICATION PACKAGE
This announcement, any attachments, and any references to external websites herein constitute the total solicitation. If proposers cannot access the referenced material posted in the announcement found at http://www.darpa.mil, contact the administrative contact listed herein.

4.2. CONTACT AND FORM OF APPLICATION SUBMISSION

All submissions, including abstracts and proposals, must be written in English with type no smaller than 12-point font. Smaller font may be used for figures, tables, and charts. The page limitation includes all figures, tables, and charts. All pages shall be formatted for printing on 8-1/2 by 11-inch paper. Margins must be 1-inch on all sides. Copies of all documents submitted must be clearly labeled with the DARPA BAA number, proposer organization, and proposal title/proposal short title.

4.2.1. Proposal Abstract Format

Proposers are strongly encouraged to submit an abstract in advance of a proposal to minimize effort and reduce the potential expense of preparing an out-of-scope proposal. DARPA will respond to abstracts providing feedback and indicating whether, after preliminary review, there is interest within BTO for the proposed work. DARPA will attempt to reply within 10 calendar days of receipt. Proposals may be submitted irrespective of comments or feedback received in response to the abstract. Proposals are reviewed without regard to feedback given as a result of abstract review. The time and date for submission of proposal abstracts are specified in Part I above.

The abstract is a concise version of the proposal comprising a maximum of five (5) pages, including all figures, tables, and charts. All submissions must be written in English with type no smaller than 12-point font. Smaller font may be used for figures, tables, and charts. All pages shall be formatted for printing on 8-1/2 by 11-inch paper. Margins must be 1-inch on all sides. Copies of all documents submitted must be clearly labeled with the DARPA BAA number, proposer organization, and proposal abstract title.

The page limit does not include:

- Official transmittal letter (optional);
- Cover sheet;
- Executive summary slides;
- Resumes; and
- Bibliography (optional).

Abstracts must include the following components:

**A. Cover Sheet (does not count towards page limit):** Include the administrative and technical points of contact (name, address, phone, fax, e-mail, lead organization). Also include the BAA number, title of the proposed project, primary subcontractors, estimated cost, duration of the project, and the label “ABSTRACT.”

**B. Goals and Impact:** Clearly describe what is being proposed and what difference it will make (qualitatively and quantitatively), including brief answers to the following questions:
1. What is the proposed work attempting to accomplish or do?
2. How is it done today? And what are the limitations?
3. What is innovative in your approach, and how does it compare to the current state-of-the-art (SOA)?
4. What are the key technical challenges in your approach, and how do you plan to overcome these?
5. Who will care, and what will the impact be if you are successful?
6. How much will it cost, and how long will it take?

C. Abstract Executive Summary Slides: The slide template is provided as Attachment 4 to the BAA posted at https://www.SAM.gov. Use of these templates are required.

D. Technical Plan: Outline and address all technical areas and challenges inherent in the approach and possible solutions for overcoming potential problems. This section should provide specific objectives, metrics, and milestones at intermediate stages of the project to demonstrate a plan for accomplishment of the program goals. Propose additional appropriate qualitative and quantitative metrics specific to the approach, as needed. Outline of intermediary milestones should occur at no greater than 6-month increments.

E. Management and Capabilities: Provide a brief summary of expertise of the team, including subcontractors and key personnel.

A principal investigator for the project must be identified, and a description of the team’s organization. All teams are strongly encouraged to identify a Project Manager/Integrator to serve as the primary point of contact to communicate with the DARPA Program Manager, IV&V partner, and Contracting Officer’s Representative, coordinate the effort across co-performer, vendor, and subcontractor teams, organize regular performer meetings or discussions, facilitate data sharing, and ensure timely completion of milestones and deliverables.

Include a description of the team’s organization including roles and responsibilities. Team member descriptions should address the Technical Plan, describe the time and percent effort divisions for members participating across multiple TAs, and delineate individuals to avoid duplication of efforts.

Describe the organizational experience in this area, existing intellectual property required to complete the project, and any specialized facilities to be used as part of the project. List Government-furnished materials or data assumed to be available. Describe any specialized facilities to be used as part of the project, the extent of access to these facilities, and any biological containment, biosafety, and certification requirements.

F. Cost and Schedule: Provide a cost estimate for resources over the proposed timeline of the project, broken down by phase and major cost items (e.g., labor, materials, etc.).
Include cost estimates for each potential subcontractor (may be a rough order of magnitude).

G. Bibliography (Optional, does not count towards page limit): If desired, include a brief bibliography with links to relevant papers and reports. The bibliography should not exceed two (2) pages.

H. Curriculum Vitae (include as a separate/standalone combined file): Include CVs of key team members, one of which must be from/for the Principal Investigator.

4.2.2. Proposal Format
As soon as the evaluation of all proposals is complete, the proposer will be notified that (1) the proposal has been selected for funding pending award negotiations, in whole or in part, or (2) the proposal has not been selected. These official notifications will be sent via e-mail to the Technical POC and Administrative POC identified on the proposal coversheet.

All full proposals must be in the format given below. Proposals shall consist of two volumes: 1) Volume I, Technical and Management Proposal, and 2) Volume II, Cost Proposal. All submissions must be written in English with type no smaller than 12-point font. A smaller font may be used for figures, tables, and charts but care should be taken to ensure legibility/readability. The page limitation includes all figures, tables, and charts. All pages shall be formatted for printing on 8-1/2 by 11-inch paper. Margins must be 1-inch on all sides. Copies of all documents submitted must be clearly labeled with the DARPA BAA number, proposer organization, and proposal title/proposal short title. Volume I, Technical and Management Proposal, may include an attached bibliography of relevant technical papers or research notes (published and unpublished) which document the technical ideas and approach upon which the proposal is based. Copies of not more than three (3) relevant papers may be included with the submission. The bibliography and attached papers are not included in the page counts given below. The submission of other supporting materials along with the proposals is strongly discouraged and will not be considered for review. The maximum page count for Volume I is 25 pages. The official transmittal letter is not included in the page count. Volume I should include the following components:

NOTE: Proposal submissions must address all the parameters listed in Table 1 as described (i.e., selection of an Environmental Domain, Environmental Condition, at least three Stimuli to be Sensed, at least one Biologically-encoded Information Processing step and at least one Output Signal/Communication Method for each proposed Tellus microbial device). Proposals that omit any of these parameter selections will be considered non-conforming and will not undergo further evaluation.

a. Volume I, Technical and Management Proposal

Section I. Administrative

A. Cover Sheet (LABELED “PROPOSAL: VOLUME I”):
1. BAA number (HR001123S0027);
2. Lead organization submitting proposal (prime contractor);
3. Type of organization, selected from among the following categories: “LARGE BUSINESS,” “SMALL DISADVANTAGED BUSINESS,” “OTHER SMALL BUSINESS,” “HBCU,” “MI,” “OTHER EDUCATIONAL,” OR “OTHER NONPROFIT”;
4. Proposer’s reference number (if any);
5. Other team members (if applicable) and type of business for each;
6. Proposal title;
7. Technical point of contact (Program Manager or Principal Investigator) to include: salutation, last name, first name, street address, city, state, zip code, telephone, fax, e-mail;
8. Administrative point of contact (Contracting Officer or Award Officer) to include: salutation, last name, first name, street address, city, state, zip code, telephone, fax, e-mail;
9. Award instrument requested: cost-plus-fixed-free (CPFF), cost-contract—no fee, cost sharing contract – no fee, or other type of procurement contract (specify), or other transaction;
10. Place(s) of performance, including all subcontractors and consultants;
11. Period of performance;
12. Total funds requested from DARPA and the amount of any cost share (if any);
13. Proposal validity period; AND
14. Date proposal was submitted.


B. Official Transmittal Letter.

C. Proposal Executive Summary Slides: The slide template is provided as Attachment 5 to the BAA posted at https://www.SAM.gov. Use of this template is required.

Section II. Detailed Proposal Information

A. Executive Summary: Provide a synopsis of the proposed project, including answers to the following questions:

- What is the proposed work attempting to accomplish or do?
- How is it done today, and what are the limitations?
- What is innovative in your approach?
- What are the key technical challenges in your approach, and how do you plan to overcome these?
- Who or what will be affected, and what will be the impact if the work is successful?
- How much will it cost, and how long will it take?
B. Goals and Impact: Clearly describe what the team is trying to achieve and the
difference it will make (qualitatively and quantitatively) if successful. Describe the
innovative aspects of the project in the context of existing capabilities and approaches,
clearly delineating the uniqueness and benefits of this project in the context of the state
of the art, alternative approaches, and other projects from the past and present. Describe
how the proposed project is revolutionary and how it significantly rises above the
current state-of-the-art. Describe the deliverables associated with the proposed project
and any plans to commercialize the technology, transition it to a customer, or further
the work.

C. Technical Plan: Outline and address technical challenges inherent in the approach and
possible solutions for overcoming potential problems. This section should provide
appropriate measurable milestones (quantitative if possible) at intermediate stages of
the program to demonstrate progress, plan for achieving the milestones, and must
include a simple process flow diagram of their final system concept. The technical plan
should demonstrate a deep understanding of the technical challenges and present a
credible (even if risky) plan to achieve the program goal. Discuss mitigation of
technical risk.

D. Management Plan: Provide a summary of expertise of the team, including any
subcontractors, and key personnel who will be doing the work. A Principal Investigator
(PI) for the project must be identified, along with a description of the team’s
organization, including the breakdown by Technical Area. All teams are strongly
encouraged to identify a Project Manager/Integrator to serve as the primary point of
contact to communicate with the DARPA Program Manager, IV & V partner, and
Contracting Officer’s Representative, coordinate the effort across co-performer, vendor,
and subcontractor teams, organize regular performer meetings or discussions, facilitate
data sharing, and ensure timely completion of milestones and deliverables.

Provide a clear description of the team’s organization including an organization chart that
includes, as applicable: the programmatic relationship of team members; the unique
capabilities of team members; the task responsibilities of team members, the teaming
strategy among the team members; and key personnel with the amount of effort to be
expended by each person during each year. Provide a detailed plan for coordination
including explicit guidelines for interaction among collaborators/subcontractors of the
proposed effort. Include risk management approaches. Describe any formal teaming
agreements that are required to execute this program.

E. Capabilities: Describe organizational experience in relevant subject area(s), existing
intellectual property, specialized facilities, and any Government-furnished materials or
information. Describe any specialized facilities to be used as part of the project, the
extent of access to these facilities, and any radiological or biological containment,
biosafety, permitting and/or certification requirements. Discuss any work in closely
related research areas and previous accomplishments.
F. Qualifications of Key Personnel NOT INCLUDED IN PAGE COUNT: Curriculum Vitae for PI, PM, and key co-Investigators (not included toward Volume 1 page count).

G. Current and pending awards NOT INCLUDED IN PAGE COUNT: Provide a list of current and pending awards related to the proposed research, including the funding source (for PI, PM/I, and key co-Investigators). Describe areas of overlap or leveraging with your Tellus proposal.

H. Statement of Work (SOW) NOT INCLUDED IN PAGE COUNT: The SOW should provide a detailed task breakdown, citing specific tasks and their connection to the milestones and program metrics. The SOW must not include proprietary information. It is encouraged, though not required, to use the SOW template provided as Attachment 3. For each task/subtask, provide:

- A detailed description of the approach to be taken to accomplish each defined task/subtask.
- Identification of the primary organization responsible for task execution (prime contractor, subcontractor(s), consultant(s), by name).
- A measurable milestone, i.e., a deliverable, demonstration, or other event/activity that marks task completion. Include completion dates for all milestones. Include quantitative metrics.
- A definition of all deliverables (e.g., data, reports, software) to be provided to the Government in support of the proposed tasks/subtasks.
- For each listed task and subtask, note whether it is envisioned to deliver Fundamental Research or Non-Fundamental Research (as described in Section 2.2). Provide a short justification of each categorization and cross-reference with listed items in the CUI guide (Attachment 1), as appropriate.

I. Schedule and Milestones: Provide a detailed schedule showing tasks (task name, duration, work breakdown structure elements as applicable, performing organization), milestones, and the interrelationships among tasks. The task structure must be consistent with that in the SOW. Measurable milestones should be clearly articulated and defined in time relative to the start of the project.

J. Technology Transfer Plan: Provide information regarding the types of partners (e.g., Government, private industry) that will be pursued and submit a timeline with incremental milestones toward successful engagement. The plan should include a description of how DARPA will be included in the development of potential technology transfer relationships. If the Technology Transfer Plan includes the formation of a start-up company, a business development strategy must also be provided.

Section III. Science & Technology Protection Implementation Plan (S&T PIP) NOT INCLUDED IN PAGE COUNT
Required for proposers who anticipate generating information that may be considered CUI in accordance with Section 1.7.2, "Controlled Unclassified Information." Provide a detailed plan for how the organization and its subcontractors will meet CUI safeguarding requirements following the program-specific CUI guidance stated in Attachment 1. The plan should provide a detailed strategy to protect CUI without unnecessarily compartmentalizing information flow within or among performer teams. This plan must describe safeguard procedures for protecting any sensitive program deliverables; it must also address all critical security risks identified by BTO Security in the S&T P2 (available upon request from BTO security, BTO_Security@darpa.mil). The Government strongly encourages proposers to use the provided S&T PIP template (Attachment 2).

Section IV. Additional Information NOT INCLUDED IN PAGE COUNT

Provide a brief bibliography of relevant technical papers and research notes (published and unpublished), which document the technical ideas upon which the proposal is based. Copies of not more than three (3) relevant papers can be included in the submission.


Cover Sheet (LABELED “PROPOSAL: VOLUME II”):

1. BAA Number (HR001123S0027);
2. Lead Organization Submitting proposal;
3. Type of organization, selected among the following categories: “LARGE BUSINESS”, “SMALL DISADVANTAGED BUSINESS”, “OTHER SMALL BUSINESS”, “HBCU”, “MI”, “OTHER EDUCATIONAL”, OR “OTHER NONPROFIT”;
4. Proposer’s reference number (if any);
5. Other team members (if applicable) and type of business for each;
6. Proposal title;
7. Technical point of contact (Program Manager or Principal Investigator) to include: salutation, last name, first name, street address, city, state, zip code, telephone, fax (if available), electronic mail (if available);
8. Administrative point of contact (Contracting Officer or Award Officer) to include: salutation, last name, first name, street address, city, state, zip code, telephone, fax (if available), and electronic mail (if available);
9. Award instrument requested: cost-plus-fixed-free (CPFF), cost-contract—no fee, cost sharing contract – no fee, or other type of procurement contract (specify), or other transaction;
10. Place(s) of performance, including all subcontractors and consultants;
11. Period of performance;
12. Total funds requested from DARPA, total funds requested (as defined in Table 1), and the amount of any cost share (if any);
13. Name, address, and telephone number of the proposer’s cognizant Defense Contract Management Agency (DCMA) administration office (if known);
14. Name, address, and telephone number of the proposer’s cognizant Defense Contract Audit Agency (DCAA) audit office (if known);
15. Date proposal was prepared;
16. Data Universal Numbering System (DUNS) number (http://www.dnb.com/get-a-duns-number.html);
17. Taxpayer ID number (https://www.irs.gov/Individuals/International-Taxpayers/Taxpayer-Identification-Numbers-TIN);
18. Commercial and Government Entity (CAGE) code (https://cage.dla.mil/Home/UsageAgree);
19. Proposal validity period

The Government requires that proposers* use the provided MS Excel™ DARPA Standard Cost Proposal Spreadsheet in the development of their cost proposals. A customized cost proposal spreadsheet may be an attachment to this solicitation. If not, the spreadsheet can be found on the DARPA website at http://www.darpa.mil/work-with-us/contract-management (under “Resources” on the right-hand side of the webpage). All tabs and tables in the cost proposal spreadsheet should be developed in an editable format with calculation formulas intact to allow traceability of the cost proposal. This cost proposal spreadsheet should be used by the prime organization and all subcontractors. In addition to using the cost proposal spreadsheet, the cost proposal still must include all other items required in this announcement that are not covered by the editable spreadsheet. Subcontractor cost proposal spreadsheets may be submitted directly to the Government by the proposed subcontractor via e-mail to the address in Part I of this solicitation. Using the provided cost proposal spreadsheet will assist the Government in a rapid analysis of your proposed costs and, if your proposal is selected for a potential award, speed up the negotiation and award execution process.

*University proposers requesting a grant, cooperative agreement, or Other Transaction for Research do not need to use the MS Excel™ DARPA Standard Cost Proposal Spreadsheet. Instead, a proposed budget and justification may be provided using the SF-424 Research & Related Budget forms provided via https://www.grants.gov.

(1) Total program, and per task cost broken down by major cost items to include:
   i. **Direct labor** – provide an itemized breakout of all personnel, listed by name or TBD, with labor rate (or salary), labor hours (or percent effort), and labor category. All senior personnel must be identified by name.
   ii. **Materials and Supplies** – itemized list which includes description of material, quantity, unit price, and total price. If a material factor is used based on historical purchases, provide data to justify the rate.
   iii. **Equipment** – itemized list which includes description of equipment, unit price, quantity, and total price. Any equipment item with a unit price over $5,000 must include a vendor quote.
   iv. **Travel** – provide an itemized list of travel costs to include purpose of trips, departure and arrival destinations, projected airfare, rental car and per GSA approved diem, number of travelers, number of days); provide screenshots from travel website for proposed airfare and rental car, as applicable; provide screenshot or web link for conference registration fee and note if the fee includes hotel cost. Conference attendance must be justified, explain how it is in the best interest of the project. **Plan for two (2) DARPA program review meetings per year.**
   v. **Other Direct Costs (e.g., computer support, clean room fees)** – Should be itemized with costs or estimated costs. Backup documentation and/or a
supporting cost breakdown is required to support proposed costs with a unit price over $5,000. An explanation of any estimating factors, including their derivation and application, must be provided. Please include a brief description of the proposers’ procurement method to be used.

vi. **Other Direct Costs** – Consultants: provide executed Consultant Agreement that describes work scope, rate and hours.

vii. **Indirect costs** including, as applicable, fringe benefits, overhead, General and Administrative (G&A) expense, and cost of money (see university vs. company specific requirements below).

viii. **Indirect costs specific to a University performer:** (1) **Fringe Benefit Rate** (provide current Department of Health and Human Services (DHHS) or Office of Naval Research (ONR) negotiated rate package; if calculated by other than a rate, provide University documentation identifying fringe costs by position or HR documentation if unique to each person); (2) **F&A Indirect Overhead Rate** (provide current DHHS or ONR negotiated rate package); (3) **Tuition Remission** (provide current University documentation justifying per-student amount); and (4) **Health Insurance/Fee** (provide current University documentation justifying per student amount, if priced separately from fringe benefits with calculations included in the EXCEL cost file).

**Indirect costs specific to a Company performer:** (1) **Fee/Profit** (provide rationale for proposed fee/profit percentage using criteria found in DFARS 215.404-70); and (2) **Fringe Benefit/Labor OH/Material OH/G&A Rates** (provide current Forwarding Pricing Rate Proposal (FPRP) or DCMA/DCAA Forward Pricing Rate Recommendation or Agreement (FPRR or FPRA). If these documents are not available, provide company historical data, preferably two years, minimum of one, to include both pool and expense costs used to generate the rates).

(2) An itemization of Subcontracts. All subcontractor cost proposal documentation must be prepared at the same level of detail as that required of the prime. Subcontractor proposals should include Interdivisional Work Transfer Agreements (IWTA) or evidence of similar arrangements (an IWTA is an agreement between multiple divisions of the same organization). The prime proposer is responsible for compiling and providing all subcontractor proposals for the Procuring Contracting Officer (PCO). The proposal must show how subcontractor costs are applied to each phase and task. If consultants are to be used, proposer must provide consultant agreement or other document that verifies the proposed loaded daily/hourly rate.

(3) An itemization of any information technology (IT) purchase (including a letter stating why the proposer cannot provide the requested resources from its own funding), as defined in FAR Part 2.101.

(4) A summary of projected funding requirements by month for all phases of the project.

(5) The source, nature, and amount of any industry cost-sharing. Where the effort consists of multiple portions that could reasonably be partitioned for purposes of
funding, these should be identified as options with separate cost estimates for each.

(6) Identification of pricing assumptions of which may require incorporation into the resulting award instrument (e.g., use of Government Furnished Property/Facilities/Information, access to Government Subject Matter Expert/s, etc.).

(7) Any Forward Pricing Rate Agreement, DHHS rate agreement, other such approved rate information, or such documentation that may assist in expediting negotiations (if available).

(8) Proposers with a Government acceptable accounting system who are proposing a cost-type contract must submit the DCAA document approving the cost accounting system.

Per FAR 15.403-4, certified cost or pricing data shall be required if the proposer is seeking a procurement contract award per the referenced threshold, unless the proposer requests and is granted an exception from the requirement to submit cost or pricing data. Certified cost or pricing data” are not required if the proposer proposes an award instrument other than a procurement contract (e.g., a grant, cooperative agreement, or other transaction.)

4.2.3. Sub-awardee Proposals
The awardee is responsible for compiling and providing all sub-awardee proposals for the Procuring Contracting Officer (PCO)/Grants Officer (GO)/Agreements Officer (AO), as applicable. Sub-awardee proposals should include Interdivisional Work Transfer Agreements (ITWA) or similar arrangements. Where the effort consists of multiple portions which could reasonably be partitioned for purposes of funding, these should be identified as options with separate cost estimates for each.

All proprietary sub-awardee proposal documentation, prepared at the same level of detail as that required of the awardee’s proposal and which cannot be uploaded with the proposed awardee’s proposal, shall be provided to the Government either by the awardee or by the sub-awardee organization when the proposal is submitted. Sub-awardee proposals submitted to the Government by the proposed sub-awardee should be submitted via e-mail to the address in Section I.

4.2.4. Other Transaction (OT) Requests
All proposers requesting an OT must include a detailed list of milestones for each phase of the program (I, II, and III). Each milestone must include the following:

- milestone description,
- completion criteria,
- due date, and
- payment/funding schedule (to include, if cost share is proposed, awardee and Government share amounts).

It is noted that, at a minimum, milestones should relate directly to accomplishment of program technical metrics as defined in the BAA and/or the proposer’s proposal. Agreement type,
expenditure or fixed-price based, will be subject to negotiation by the Agreements Officer. Do not include proprietary data.

4.2.5. Additional Proposal Information

Proprietary Markings
Proposers are responsible for clearly identifying proprietary information. Submissions containing proprietary information must have the cover page and each page containing such information clearly marked with a label such as “Proprietary” or “Company Proprietary.” NOTE: “Confidential” is a classification marking used to control the dissemination of U.S. Government National Security Information as dictated in Executive Order 13526 and should not be used to identify proprietary business information.

Unclassified Submissions
DARPA anticipates that submissions received under this BAA will be unclassified. However, should a proposer wish to submit classified information, an unclassified e-mail must be sent to the BAA mailbox requesting submission instructions from the Technical Office Program Security Officer (PSO). If a determination is made that the award instrument may result in access to classified information, a Security Classification Guide (SCG) and/or DD Form 254 will be issued by DARPA and attached as part of the award.

Controlled Unclassified Information (CUI)
For unclassified proposals containing CUI, applicants will ensure personnel and information systems processing CUI security requirements are in place.

If an unclassified submission contains CUI or the suspicion of such, as defined by Executive Order 13556 and 32 C.F.R. Part 2002, the information must be appropriately and conspicuously marked CUI in accordance with DoD Instruction (DoDI) 5200.48. Identification of what is CUI about this DARPA program is described in Attachment 1 - CUI Guide.

Unclassified submissions containing CUI may be submitted via DARPA’s BAA Website (https://baa.darpa.mil) in accordance with Section 4.2.4 of this BAA.

Proposers submitting proposals involving the pursuit and protection of DARPA information designated as CUI must have, or be able to acquire prior to contract award, an information system authorized to process CUI information IAW NIST SP 800-171 and DoDI 8582.01.
Approved Cost Accounting System Documentation

Proposers that do not have a Cost Accounting Standards (CAS) complaint accounting system considered adequate for determining accurate costs that are negotiating a cost-type procurement contract must complete an SF 1408. For more information on CAS compliance, see http://www.dcaa.mil/cas.html. To facilitate this process, proposers should complete the SF 1408 found at http://www.gsa.gov/portal/forms/download/115778 and submit the completed form with the proposal.

Small Business Subcontracting Plan

Pursuant to Section 8(d) of the Small Business Act (15 U.S.C. § 637(d)) and FAR 19.702(a)(1), each proposer who submits a contract proposal and includes subcontractors might be required to submit a subcontracting plan with their proposal. The plan format is outlined in FAR 19.704.

Section 508 of the Rehabilitation Act (29 U.S.C. § 749d)/FAR 39.2

All electronic and information technology acquired or created through this BAA must satisfy the accessibility requirements of Section 508 of the Rehabilitation Act (29 U.S.C. § 749d)/FAR 39.2.

Intellectual Property

All proposers must provide a good faith representation that the proposer either owns or possesses the appropriate licensing rights to all intellectual property that will be utilized under the proposed effort.

For Procurement Contracts

Proposers responding to this BAA requesting procurement contracts will need to complete the certifications at DFARS 252.227-7017. See http://www.darpa.mil/work-with-us/additional-baa for further information. If no restrictions are intended, the proposer should state “none.” The table below captures the requested information:

<table>
<thead>
<tr>
<th>Technical Data</th>
<th>Summary of Intended Use in the Conduct of the Research</th>
<th>Basis for Assertion</th>
<th>Asserted Rights Category</th>
<th>Name of Person Asserting Restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Software to be Furnished with Restrictions</td>
<td>(LIST)</td>
<td>(LIST)</td>
<td>(LIST)</td>
<td>(LIST)</td>
</tr>
<tr>
<td>(LIST)</td>
<td>(NARRATIVE)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
For All Non-Procurement Contracts

Proposers responding to this BAA requesting a Cooperative Agreement, Technology Investment Agreement, or Other Transaction for Prototypes shall follow the applicable rules and regulations governing these various award instruments, but, in all cases, should appropriately identify any potential restrictions on the Government’s use of any Intellectual Property contemplated under the award instrument in question. This includes both Noncommercial Items and Commercial Items. Proposers are encouraged to use a format similar to that described in the section above. If no restrictions are intended, then the proposer should state “NONE.”

System for Award Management (SAM) and Universal Identifier Requirements

All proposers must be registered in SAM unless exempt per FAR 4.1102. FAR 52.204-7, “System for Award Management” and FAR 52.204-13, “System for Award Management Maintenance” are incorporated into this solicitation. See http://www.darpa.mil/work-with-us/additional-baa for further information.

International entities can register in SAM by following the instructions in this link: https://www.fsd.gov/sys_attachment.do?sys_id=c08b64ab1b4434109ac5ddb6bc4bcbb8.

4.2.6. Disclosure of Information and Compliance with Safeguarding Covered Defense Information Controls

The following provisions and clause apply to all solicitations and contracts; however, the definition of “controlled technical information” clearly exempts work considered fundamental research and therefore, even though included in the contract, will not apply if the work is fundamental research.

DFARS 252.204-7000, “Disclosure of Information”

DFARS 252.204-7008, “Compliance with Safeguarding Covered Defense Information Controls”

DFARS 252.204-7012, “Safeguarding Covered Defense Information and Cyber Incident Reporting”

The full text of the above solicitation provision and contract clauses can be found at http://www.darpa.mil/work-with-us/additional-baa#NPRPAC.

Compliance with the above requirements includes the mandate for proposers to implement the security requirements specified by National Institute of Standards and Technology (NIST) Special Publication (SP) 800-171, “Protecting Controlled Unclassified Information in Nonfederal Information Systems and Organizations” (see https://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-171r2.pdf) and DoDI 8582.01 that are in effect at the time the solicitation is issued.

For awards where the work is considered fundamental research, the contractor will not have to implement the aforementioned requirements and safeguards. However, should the nature of the work change during performance of the award, work not considered fundamental research will be subject to these requirements.

4.2.7. Submission Information

DARPA will acknowledge receipt of all submissions and assign an identifying control number that should be used in all further correspondence regarding the submission. DARPA intends to
use electronic mail correspondence regarding HR001123S0027. Submissions may not be sent by fax or e-mail; any so sent will be disregarded.

Submissions will not be returned. An electronic copy of each submission received will be retained at DARPA and all other non-required copies destroyed. A certification of destruction may be requested, provided the formal request is received by DARPA within 5 days after notification that a proposal was not selected.

For abstract and proposal submission dates, see Part I., Overview Information. Submissions received after these dates and times may not be reviewed.

Abstracts and Full Proposals sent in response to HR001123S0027 may be submitted via DARPA’s BAA Website (https://baa.darpa.mil). Visit the website to complete the two-step registration process. Submitters will need to register for an Extranet account (via the form at the URL listed above) and wait for two separate e-mails containing a username and temporary password. After accessing the Extranet, submitters may then create an account for the DARPA BAA website (via the “Register your Organization” link along the left side of the homepage), view submission instructions, and upload/finalize the abstract. Proposers using the DARPA BAA Website may encounter heavy traffic on the submission deadline date; it is highly advised that the submission process be started as early as possible.

All unclassified concepts submitted electronically through DARPA’s BAA Website must be uploaded as zip files (.zip or .zipx extension). The final zip file should be no greater than 50 MB in size. Only one zip file will be accepted per submission. Classified submissions and proposals requesting or cooperative agreements should NOT be submitted through DARPA’s BAA Website (https://baa.darpa.mil), though proposers will likely still need to visit https://baa.darpa.mil to register their organization (or verify an existing registration) to ensure the BAA office can verify and finalize their submission.

Technical support for BAA Website may be reached at BAAT_Support@darpa.mil, and is typically available during regular business hours, (9:00 AM- 5:00 PM EST Monday – Friday).

Proposers using the DARPA BAA Website may encounter heavy traffic on the submission deadline date; it is highly advised that the submission process be started as early as possible.

For Cooperative Agreements only:

Proposers requesting cooperative agreements must submit proposals through one of the following methods: (1) electronic upload per the instructions at https://www.grants.gov/applicants/apply-for-grants.html (DARPA-preferred); or (2) hard-copy mailed directly to DARPA. If proposers intend to use Grants.gov as their means of submission, then they must submit their entire proposal through Grants.gov; applications cannot be submitted in part to Grants.gov and in part as a hard-copy. Proposers using Grants.gov do not submit hard-copy proposals in addition to the Grants.gov electronic submission.
Submissions: In addition to the volumes and corresponding attachments requested elsewhere in this solicitation, proposers must also submit the three forms listed below.


To evaluate compliance with Title IX of the Education Amendments of 1972 (20 U.S.C. § 1681 et.seq.), the Department of Defense (DoD) is collecting certain demographic and career information to be able to assess the success rates of women who are proposed for key roles in applications in science, technology, engineering or mathematics disciplines. In addition, the National Defense Authorization Act (NDAA) for FY 2019, Section 1286, directs the Secretary of Defense to protect intellectual property, controlled information, key personnel, and information about critical technologies relevant to national security and limit undue influence, including foreign talent programs by countries that desire to exploit United States’ technology within the DoD research, science and technology, and innovation enterprise. This requirement is necessary for all research and research-related educational activities. The DoD is using the two forms below to collect the necessary information to satisfy these requirements. Detailed instructions for each form are available on Grants.gov.

Form 2: The Research and Related Senior/Key Person Profile (Expanded) form, available on the Grants.gov website at https://apply07.grants.gov/apply/forms/sample/RR_KeyPersonExpanded_3_0-V3.0.pdf, will be used to collect the following information for all senior/key personnel, including Project Director/Principal Investigator and Co-Project Director/Co-Principal Investigator, whether or not the individuals' efforts under the project are funded by the DoD. The form includes 3 parts: the main form administrative information, including the Project Role, Degree Type and Degree Year; the biographical sketch; and the current and pending support. The biographical sketch and current and pending support are to be provided as attachments:

- **Biographical Sketch:** Mandatory for Project Directors (PD) and Principal Investigators (PI), optional, but desired, for all other Senior/Key Personnel. The biographical sketch should include information pertaining to the researchers:
  - Education and Training.
  - Research and Professional Experience.
  - Collaborations and Affiliations (for conflict of interest).
  - Publications and Synergistic Activities.

- **Current and Pending Support:** Mandatory for all Senior/Key Personnel including the PD/PI. This attachment should include the following information:
  - A list of all current projects the individual is working on, in addition to any future support the individual has applied to receive, regardless of the source.
  - Title and objectives of the other research projects.
  - The percentage per year to be devoted to the other projects.
  - The total amount of support the individual is receiving in connection to each of the other research projects or will receive if other proposals are awarded.
Name and address of the agencies and/or other parties supporting the other research projects

Period of performance for the other research projects.

Additional senior/key persons can be added by selecting the “Next Person” button at the bottom of the form. Note that, although applications without this information completed may pass Grants.gov edit checks, if DARPA receives an application without the required information, DARPA may determine that the application is incomplete and may cause your submission to be rejected and eliminated from further review and consideration under the solicitation. DARPA reserves the right to request further details from the applicant before making a final determination on funding the effort.

Form 3: Research and Related Personal Data, available on the Grants.gov website at https://apply07.grants.gov/apply/forms/sample/RR_PersonalData_1_2-V1.2.pdf. Each applicant must complete the name field of this form, however, provision of the demographic information is voluntary. Regardless of whether the demographic fields are completed or not, this form must be submitted with at least the applicant’s name completed.

Grants.gov Submissions: Grants.gov requires proposers to complete a one-time registration process before a proposal can be electronically submitted. First-time registration can take between three business days and four weeks. For more information about registering for Grants.gov, see http://www.darpa.mil/work-with-us/additional-baa.

Proposal abstracts will not be accepted if submitted via Grants.gov. Failure to comply with the submission procedures may result in the submission not being evaluated. DARPA will acknowledge receipt of complete submissions via email and assign control numbers that should be used in all further correspondence regarding proposals.

4.3. FUNDING RESTRICTIONS
Not applicable.

4.4. OTHER SUBMISSION INFORMATION
DARPA will post a consolidated Frequently Asked Questions (FAQ) document. To access the posting go to http://www.darpa.mil/work-with-us/opportunities. A link to the FAQ will appear under the HR001123S0027 summary. Submit your question(s) via e-mail Tellus@darpa.mil.

5. Application Review Information

5.1. EVALUATION CRITERIA
Proposals will be evaluated using the following criteria, listed in descending order of importance: 5.1.1 Overall Scientific and Technical Merit; 5.1.2 Potential Contribution and Relevance to the DARPA Mission; 5.1.3 Cost Realism; and 5.1.4 Proposer’s Capabilities and/or Related Experience.

5.1.1. Overall Scientific and Technical Merit
The proposed technical approach is innovative, feasible, achievable, and complete.
The proposed technical team has the expertise and experience to accomplish the proposed tasks. Task descriptions and associated technical elements provided are complete and in a logical sequence with all proposed deliverables clearly defined such that a final outcome that achieves the goal can be expected as a result of award. The proposal identifies major technical risks, and planned mitigation efforts are clearly defined and feasible. The timeline for achieving major milestones is aggressive but rationally supported with a clear description of the requirements and risks. The proposer's prior experience in similar efforts must clearly demonstrate an ability to deliver products that meet the proposed technical performance within the proposed budget and schedule. The proposed team has the expertise to manage the cost and schedule.

5.1.2. Potential Contribution and Relevance to the DARPA Mission
The potential contributions of the proposed effort are relevant to the national technology base. Specifically, DARPA’s mission is to make pivotal early technology investments that create or prevent strategic surprise for U.S. National Security.

5.1.3. Cost Realism
The proposed costs are realistic for the technical and management approach and accurately reflect the technical goals and objectives of the solicitation. The proposed costs are consistent with the proposer's Statement of Work and reflect a sufficient understanding of the costs and level of effort needed to successfully accomplish the proposed technical approach. The costs for the prime proposer and proposed subawardees are substantiated by the details provided in the proposal (e.g., the type and number of labor hours proposed per task, the types and quantities of materials, equipment and fabrication costs, travel and any other applicable costs and the basis for the estimates).

It is expected that the effort will leverage all available relevant prior research in order to obtain the maximum benefit from the available funding. For efforts with a likelihood of commercial application, appropriate direct cost sharing may be a positive factor in the evaluation. DARPA recognizes that undue emphasis on cost may motivate proposers to offer low-risk ideas with minimum uncertainty and to staff the effort with junior personnel in order to be in a more competitive posture. DARPA discourages such cost strategies.

5.1.4. Proposer’s Capabilities and/or Related Experience
The proposer's prior experience in similar efforts clearly demonstrates an ability to deliver products that meet the proposed technical performance within the proposed budget and schedule. The proposed team has the expertise to manage the cost and schedule. Similar efforts completed/ongoing by the proposer in this area are fully described including identification of other Government sponsors.

5.2. REVIEW OF PROPOSALS

5.2.1. Review Process
It is the policy of DARPA to ensure impartial, equitable, comprehensive proposal evaluations based on the evaluation criteria listed in Section V.A. and to select the source (or sources) whose offer meets the Government's technical, policy, and programmatic goals.
DARPA will conduct a scientific/technical review of each conforming proposal. Conforming proposals comply with all requirements detailed in this solicitation; proposals that fail to do so may be deemed non-conforming and may be removed from consideration. Proposals will not be evaluated against each other since they are not submitted in accordance with a common work statement. DARPA’s intent is to review proposals as soon as possible after they arrive; however, proposals may be reviewed periodically for administrative reasons.

Proposal submissions must address all the parameters listed in Table 1 as described (i.e., selection of an Environmental Domain, Environmental Condition, at least three Stimuli to be Sensed, at least one Biologically-encoded Information Processing step and at least one Output Signal/Communication Method for each proposed Tellus microbial device). Proposals that omit any of these parameter selections will be considered non-conforming and will not undergo further evaluation.

Award(s) will be made to proposers whose proposals are determined to be the most advantageous to the Government, consistent with instructions and evaluation criteria specified in the BAA herein, and availability of funding.

5.2.2. Handling of Source Selection Information

DARPA policy is to treat all submissions as source selection information (see FAR 2.101 and 3.104) and to disclose their contents only for the purpose of evaluation. Restrictive notices notwithstanding, during the evaluation process, submissions may be handled by support contractors for administrative purposes and/or to assist with technical evaluation. All DARPA support contractors performing this role are expressly prohibited from performing DARPA-sponsored technical research and are bound by appropriate nondisclosure agreements.

Subject to the restrictions set forth in FAR 37.203(d), input on technical aspects of the proposals may be solicited by DARPA from non-Government consultants/experts who are strictly bound by the appropriate non-disclosure requirements.

5.2.3. Federal Awardee Performance and Integrity Information (FAPIIS)

Per 41 U.S.C. § 2313, as implemented by FAR 9.103 and 2 CFR § 200.205, prior to making an award above the simplified acquisition threshold, DARPA is required to review and consider any information available through the designated integrity and performance system (currently FAPIIS). Awardees have the opportunity to comment on any information about themselves entered in the database, and DARPA will consider any comments, along with other information in FAPIIS or other systems, prior to making an award.

5.2.4. Countering Foreign Influence Program (CFIP)

DARPA’s CFIP is an adaptive risk management security program designed to help protect the critical technology and performer intellectual property associated with DARPA’s research projects by identifying the possible vectors of undue foreign influence. The CFIP team will create risk assessments of all proposed Senior/Key Personnel selected for negotiation of a fundamental research grant or cooperative agreement award. The CFIP risk assessment process will be conducted separately from the DARPA scientific review process and adjudicated prior to final award.
6. Award Administration Information

6.1. SUBMISSION STATUS NOTIFICATIONS
Proposal Abstracts and Full Proposals submitted in response to HR001123S0027 will be evaluated following the submission deadlines listed in Part 1. DARPA will respond as described below. These official notifications will be sent via e-mail to the Technical Point of Contact (POC) and/or Administrative POC identified on the submission coversheet.

6.1.1. Proposal Abstracts
DARPA will respond to abstracts with a statement as to whether DARPA is interested in the idea. If DARPA does not recommend the proposer submit a full proposal, DARPA will provide feedback to the proposer regarding the rationale for this decision. Regardless of DARPA’s response to an abstract, proposers may submit a full proposal. DARPA will review all conforming full proposals using the published evaluation criteria and without regard to any comments resulting from the review of an abstract.

6.1.2. Full Proposals
As soon as the evaluation of a proposal is complete, the proposer will be notified that (1) the proposal has been selected for funding pending award negotiations, in whole or in part, or (2) the proposal has not been selected.

6.2. ADMINISTRATIVE AND NATIONAL POLICY REQUIREMENTS

6.2.1. Meeting and Travel Requirements
There will be a program kickoff meeting in the Arlington, VA vicinity and all key participants are required to attend. Performers should also anticipate regular program-wide PI meetings and periodic site visits at the Program Manager’s discretion. Proposers shall include within the content of their proposal details and costs of any travel or meetings they deem to be necessary throughout the course of the effort, to include periodic status reviews by the Government.

6.2.2. Solicitation Provisions and Award Clauses, Terms and Conditions
Solicitation clauses in the FAR and DFARS relevant to procurement contracts and FAR and DFARS clauses that may be included in any resultant procurement contracts are incorporated herein and can be found at http://www.darpa.mil/work-with-us/additional-baa.

6.2.3. Controlled Unclassified Information (CUI) and Controlled Technical Information (CTI) on Non-DoD Information Systems
Further information on Controlled Unclassified Information on Non-DoD Information Systems is incorporated herein can be found at http://www.darpa.mil/work-with-us/additional-baa.

6.2.4. Representations and Certifications
In accordance with FAR 4.1102 and 4.1201, proposers requesting a procurement contract must complete electronic annual representations and certifications at https://www.sam.gov/. In addition, all proposers are required to submit for all award instrument types supplementary DARPA-specific representations and certifications at the time of proposal submission. See

A small business joint venture offeror must submit, with its offer, the representation required in paragraph (c) of FAR solicitation provision 52.212-3, Offeror Representations and Certifications-Commercial Products and Commercial Services, and paragraph (c) of FAR solicitation provision 52.219-1, Small Business Program Representations, in accordance with 52.204-8(d) and 52.212-3(b) for the following categories: (A) Small business; (B) Service-disabled veteran-owned small business; (C) Women-owned small business (WOSB) under the WOSB Program; (D) Economically disadvantaged women-owned small business under the WOSB Program; or (E) Historically underutilized business zone small business.

6.2.5. Terms and Conditions


6.3. REPORTING

The number and types of reports will be specified in the award document, but will include as a minimum monthly financial status reports, monthly technical status reports, and quarterly technical status reports. For awards that involve CUI, updates to the proposer’s S&T PIP will be submitted at the end of Month 1, Month 13 and Month 21. These reports and documents shall be prepared and submitted in accordance with the procedures contained in the award document and mutually agreed on before award. Reports and briefing material will also be required as appropriate to document progress in accomplishing program metrics. A Final Report that summarizes the project and tasks will be required at the conclusion of the performance period for the award, notwithstanding the fact that the research may be continued under a follow-on vehicle.

6.4. ELECTRONIC SYSTEMS

6.4.1. Wide Area Work Flow (WAWF)

Performers will be required to submit invoices for payment directly to https://wawf.eb.mil, unless an exception applies. Performers must register in WAWF prior to any award under this BAA.

6.4.2. I-EDISON

The award document for each proposal selected for funding will contain a mandatory requirement for patent reports and notifications to be submitted electronically through i-Edison (http://public.era.nih.gov/iedison).

7. Agency Contacts
Administrative, technical or contractual questions should be sent via e-mail to the mailbox listed below.

Points of Contact
The BAA Coordinator for this effort may be reached at:
Tellus@darpa.mil
DARPA/BTO
ATTN: HR001123S0027
675 North Randolph Street
Arlington, VA 22203-2114

For information concerning agency level protests see http://www.darpa.mil/work-with-us/additional-baa#NPRPAC.

8. Other Information

8.1. PROPOSERS DAY

The Biological Technologies Office (BTO) of the Defense Advanced Research Projects Agency (DARPA) will host a virtual Proposer’s Day for the potential proposer community in support of this Broad Agency Announcement (BAA) for the Tellus Program on May 2, 2023. A link to the Special Notice announcing this Proposer’s Day as well as information relayed during the event will be made available on the BTO section of the DARPA Opportunities page: https://www.darpa.mil/work-with-us/opportunities. Attendance at this event is not a requirement for submission of an abstract, proposal or selection for funding. To maximize the pool of innovative proposal concepts, DARPA strongly encourages participation by non-traditional performers (e.g., small businesses, academic and research institutions, and first-time Government contractors).

The Proposer’s Day goals will include:

1. Introduce the Tellus program vision and goals to the research community;
2. Explain the mechanics of a DARPA program in general and the objectives and milestones of this program in particular; and
3. Encourage and promote teaming arrangements among organizations that have the relevant expertise, research facilities, and capabilities for executing research and development responsive to the Tellus program goals.

The Proposer’s Day will include brief overview presentations by Government personnel as well as an information session to respond to questions from participants. Potential performers will be able to highlight their technical capabilities through “lightning” talks such that teaming relationships can be developed. It is expected that Tellus will require strong teaming efforts to successfully innovate and integrate critical technologies necessary to meet the metrics of the
program. Potential performers will be able to publish profiles of their expertise and sought-after capabilities for prospective teammates to establish partnerships.

Proposers Day Point of Contact:
Tellus@darpa.mil
ATTN: DARPA-SN-23-41

8.2. UNIVERSITY FUNDING

In order to ensure that U.S. scientific and engineering students will be able to continue to make strategic technological advances, DARPA is committed to supporting the work and study of Ph.D students and post-doctoral researchers that began work under a DARPA-funded program awarded through an assistance instrument. Stable and predictable federal funding enables these students to continue their scientific and engineering careers.

To that end, should a DARPA funded program (awarded through a grant or cooperative agreement with a university or a Research Other Transaction pursuant to 10 U.S.C. § 4021 where the university is a participant) end before the negotiated period of performance, DARPA will continue to fund, for no more than two semesters (or equivalent), stipend costs to Ph.D students and/or post-doctoral researchers. The stipend amount will be determined at the time of award based on the costs included for such participants in the University’s original proposal. Universities are expected to make reasonable efforts to find alternative research opportunities for these participants before stipend funding is provided in this situation. This additional funding will not be provided in cases where an assistance award option is not exercised or any other scenario in which the University was aware at the time of award that the period of performance might not continue after a designated programmatic decision (i.e. a down-selection or inclusion of a subsequent programmatic phase).
9. APPENDIX 1 – Volume II checklist

Volume II, Cost Proposal
Checklist and Sample Templates

The following checklist and sample templates are provided to assist the proposer in developing a complete and responsive cost volume. Full instructions appear in Section 4.2.2 of HR001123S0027. This worksheet must be included with the coversheet of the Cost Proposal.

1. Are all items from Section 4.2.2 (Volume II, Cost Proposal) of HR001123S0027 included on your Cost Proposal cover sheet?
   ○ YES   ○ NO          Appears on Page(s) [Type text]
   If reply is “No”, please explain:

2. Does your Cost Proposal include (1) a summary cost buildup by Phase, (2) a summary cost buildup by Year, and (3) a detailed cost buildup of for each Phase that breaks out each task and shows the cost per month?
   ○ YES   ○ NO          Appears on Page(s) [Type text]
   If reply is “No”, please explain:

3. Does your cost proposal (detailed cost buildup #3 above in item 2) show a breakdown of the major cost items listed below:
   Direct Labor (Labor Categories, Hours, Rates)
   ○ YES   ○ NO          Appears on Page(s) [Type text]
   Indirect Costs/Rates (i.e., overhead charges, fringe benefits, G&A)
   ○ YES   ○ NO          Appears on Page(s) [Type text]
   Materials and/or Equipment
   ○ YES   ○ NO          Appears on Page(s) [Type text]
   Subcontracts/Consultants
   ○ YES   ○ NO          Appears on Page(s) [Type text]
   Other Direct Costs
   ○ YES   ○ NO          Appears on Page(s) [Type text]
   Travel
   ○ YES   ○ NO          Appears on Page(s) [Type text]
   If reply is “No”, please explain:

4. Have you provided documentation for proposed costs related to travel, to include purpose of trips, departure and arrival destinations and sample airfare?
   ○ YES   ○ NO          Appears on Page(s) [Type text]
If reply is “No”, please explain:

5. Does your cost proposal include a complete itemized list of all material and equipment items to be purchased (a priced bill-of-materials (BOM))?  
   ○ YES  ○ NO  Appears on Page(s) [Type text]

If reply is “No”, please explain:

6. Does your cost proposal include vendor quotes or written engineering estimates (basis of estimate) for all material and equipment with a unit price exceeding $5000?  
   ○ YES  ○ NO  Appears on Page(s) [Type text]

If reply is “No”, please explain:

7. Does your cost proposal include a clear justification for the cost of labor (written labor basis-of-estimate (BOE)) providing rationale for the labor categories and hours proposed for each task?  
   ○ YES  ○ NO  Appears on Page(s) [Type text]

If reply is “No”, please explain:

8. Do you have subcontractors/consultants? If YES, continue to question 9. If NO, skip to question 13.  
   ○ YES  ○ NO  Appears on Page(s) [Type text]

9. Does your cost proposal include copies of all subcontractor/consultant technical (to include Statement of Work) and cost proposals?  
   ○ YES  ○ NO  Appears on Page(s) [Type text]

If reply is “No”, please explain:

10. Do all subcontract proposals include the required summary buildup, detailed cost buildup, and supporting documentation (SOW, Bill-of-Materials, Basis-of-Estimate, Vendor Quotes, etc.)?  
    ○ YES  ○ NO  Appears on Page(s) [Type text]

If reply is “No”, please explain:

11. Does your cost proposal include copies of consultant agreements, if available?  
    ○ YES  ○ NO  Appears on Page(s) [Type text]

If reply is “No”, please explain:

12. If requesting a FAR-based contract, does your cost proposal include a tech/cost analysis for all proposed subcontractors?
13. Have all team members (prime and subcontractors) who are considered a Federally Funded Research & Development Center (FFRDC), included documentation that clearly demonstrates work is not otherwise available from the private sector AND provided a letter on letterhead from the sponsoring organization citing the specific authority establishing their eligibility to propose to Government solicitations and compete with industry, and compliance with the associated FFRDC sponsor agreement and terms and conditions.

If reply is “No”, please explain:

14. Does your proposal include a response regarding Organizational Conflicts of Interest?

If reply is “No”, please explain:

15. Does your proposal include a completed Data Rights Assertions table/certification?

If reply is “No”, please explain: